GENERAL SYMBOLS

- DIRECTION OF PIPE PITCH (DOWN)
- DIRECTION OF FLOW
- ANCHOR
- REDUCER OR INCREASER
- TOP CONNECTION, 45° OR 90°
- BOTTOM CONNECTION, 45° OR 90°
- SIDE CONNECTION
- CAPPED OUTLET
- RISE OR DROP IN PIPE
- UNION
- PIPE UP
- PIPE DOWN
- POINT OF CONNECTION BETWEEN NEW AND EXISTING WORK
- LIMIT OF DEMOLITION
- THERMOMETER
- PRESSURE GAGE
- FLOW ELEMENT
- TEST PLUG (PRESSURE/TEMPERATURE)
- AUTOMATIC AIR VENT
- MANUAL AIR VENT
- THERMOSTAT
- HUMIDISTAT

GENERAL NOTES

1. ALL WORK SHALL BE IN COMPLIANCE WITH THE MOST STRINGENT OF FEDERAL, STATE AND LOCAL CODES, HOSPITAL POLICY, AND THE FEBRUARY 2008 HVAC DESIGN MANUAL FOR NEW, REPLACEMENT, ADDITION, AND RENOVATION OF EXISTING VA FACILITIES.
2. INSTALL ALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
3. CONTRACTOR SHALL REMOVE ALL ABANDONED PIPES AND DUCTS BACK TO MAIN OR SOURCE. REMOVE ALL HANGERS AND SUPPORTS ASSOCIATED WITH ABANDONED SYSTEM.
4. EXISTING UTILITIES TO BE ABANDONED SHALL BE PROPERLY DISCONNECTED AND CAPPED AS REQUIRED BACK TO SOURCE.
5. THESE DRAWINGS ARE DIAGRAMMATIC AND SHALL NOT BE SCALED. ADDITIONAL DATA SHALL BE FROM THE ENGINEER THROUGH WRITTEN CLARIFICATION ONLY. VERIFY ALL EXISTING CONDITIONS, ELEVATIONS, AND DIMENSIONS PRIOR TO PROCEEDING WITH ANY PORTION OF ANY WORK. THE CONTRACTOR SHALL PROVIDE ALL OFFSETS AND TRANSITIONS REQUIRED TO MEET EXISTING CONDITIONS. A PRE-BID SITE SURVEY IS RECOMMENDED. NO ADDITIONAL CHARGES, AT OWNERS EXPENSE, FOR REVISIONS DUE TO EXISTING SITE CONDITIONS.
6. THE CONTRACTOR SHALL PERFORM WORK IN A SKILLED AND PROFESSIONAL MANNER.
7. ALL CONTRACTORS ARE RESPONSIBLE TO FIELD COORDINATE WORK SCHEDULE AND VERIFY AREA SHUTDOWN WITH THE OWNER REPRESENTATIVE (COTR) PRIOR TO CONSTRUCTION.
8. THE CONTRACTOR SHALL WORK AND COORDINATE WITH THE OTHER TRADES.
9. ALL EQUIPMENT SHALL BE NEW AND IN UNDAMAGED CONDITION. ANY EQUIPMENT FOUND DEFECTIVE SHALL BE IMMEDIATELY REMOVED FROM THE PROJECT.
10. ALL EQUIPMENT SHALL BE INSTALLED IN A MANOR TO ALLOW SERVICE. SEE SPECIFICATIONS.
11. MECHANICAL CONTRACTOR TO REPAIR ANY DAMAGE DONE TO THE FIRE PROOFING WHILE INSTALLING THE MECHANICAL TRADES. SEAL ALL PENETRATIONS THROUGH RATED STRUCTURES WITH UL LISTED FIRE SEAL DESIGNED FOR THE SPECIFIED APPLICATION.
12. CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES TO PROTECT THE PUBLIC AND ADJACENT PROPERTIES FROM DAMAGE THROUGHOUT CONSTRUCTION.
13. CONTRACTOR SHALL GUARANTEE ALL WORKMANSHIP AND MATERIALS FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF SUBSTANTIAL COMPLETION OR AS OTHERWISE REQUIRED IN THE SPECIFICATIONS.
14. PROJECT COMPLETION, RECORD (AS-BUILT) DRAWINGS SHALL BE PROVIDED BY THE CONTRACTOR TO THE FACILITIES ENGINEERING SERVICES DEPARTMENT, TO BE ADDED TO THE CAD FILES THAT ARE MAINTAINED THERE. ALL CHANGES IN PIPING AND DUCTWORK ARRANGEMENTS SHALL BE NOTED ON THE RECORD DRAWINGS.
15. CONTRACTOR SHALL SUPPLY ALL MATERIALS AND DEVICES TO MAINTAIN AND MONITOR NEGATIVE PRESSURE IN ALL CONSTRUCTION ZONES AND SHALL WORK WITHIN INTERIM LIFE SAFETY MEASURES (ILSM) PROVIDED BY THE OWNER.
16. ALL WORK IN CORRIDORS AND PUBLIC AREAS MUST BE COMPLETED BETWEEN THE HOURS OF 4:30 PM AND 12:30 AM. NO LOUD NOISES, VIBRATIONS, OR DRILLING SHALL BE DONE AFTER 9:00 PM.
17. ALL WORK SHALL BE PERFORMED BY PERSONNEL LICENSED IN THE STATE OF MICHIGAN. (AS REQUIRED)
18. ALL SECONDARY HUMIDIFICATION ROOM CONTROL POINTS TO BE CONNECTED TO THE EXISTING BUILDING AUTOMATION SYSTEM (BAS).
19. CONTRACTOR TO OFFSET, REVISE OR RELOCATE EQUIPMENT, DUCTWORK AND PIPING LOCATIONS AS REQUIRED FOR INSTALLATION. SUBMIT REVISIONS TO OWNER (COTR) AND ENGINEER FOR APPROVAL PRIOR TO INSTALLATION.
20. CONTRACTOR TO MAKE ALTERATIONS TO EXISTING SERVICE PIPING AT TIMES THAT WILL PROVIDE THE LEAST INTERFERENCE WITH THE NORMAL OPERATION OF THE FACILITY.
21. CONTRACTOR TO REMOVE AND REPLACE DUCT SECTIONS AS REQUIRED FOR NEW DUCT AND PIPING INSTALLATION. COORDINATE WORK SCHEDULE AND AREA SHUTDOWN WITH THE OWNER REPRESENTATIVE (COTR) PRIOR TO CONSTRUCTION.
22. CONTRACTOR TO VERIFY FINAL FINISH AND MATERIAL SELECTIONS SUCH AS CEILINGS AND OTHER SURFACES WITH VA MEDICAL CENTER.
23. PROVIDE FIRE AND SMOKE STOPPING IN ACCORDANCE WITH UL APPROVED SYSTEMS.
24. VERIFY ALL EXISTING CONDITIONS NOTIFY ENGINEER OF ANY CONFLICTS BETWEEN CONTRACT DRAWINGS AND ACTUAL CONDITIONS.

GENERAL MECHANICAL COORDINATION NOTES:

MECHANICAL COORDINATION NOTES:

THE MECHANICAL CONTRACTOR, HAVING RESPONSIBILITY FOR INSTALLATION OF THE LARGEST SYSTEM EQUIPMENT AND COMPONENTS; AND HAVING THE BENEFIT OF BEING ABLE TO VIEW THE SPACE FOLLOWING REMOVAL OF EXISTING EQUIPMENT AND SYSTEMS SHALL:

1. PROVIDE LEGIBLE AND CLEARLY MARKED UP DRAWINGS (1/4"=1') TO THE OWNER AND THE ENGINEER INDICATING LOCATION OF BEAMS AND JOISTS AND PROVIDING A MEASUREMENT OF THE ELEVATION OF THE BOTTOM OF BEAMS AND JOISTS ABOVE THE FINISHED FLOOR.
2. PROVIDE TO THE OWNER AND ENGINEER COMPREHENSIVE, HIGH RESOLUTION, ORGANIZED, PHOTOGRAPHS OF THE CLEARED SPACE AFTER DEMOLITION IS COMPLETE AND BEFORE THE START OF INSTALLATION.
3. PROVIDE TO THE OWNER AND ENGINEER TO SCALE (MINIMUM 1/4"=1') DIMENSIONED FLOOR AND STRUCTURAL DRAWINGS CLEARLY ESTABLISHING LOCATIONS AND SIZES OF NEW OPENINGS TO MECHANICAL SHAFTS. THESE LOCATIONS MUST BE DOCUMENTED ON INSTALLATION COORDINATION DRAWINGS INDICATED IN THE FOLLOWING.
4. REVIEW FINDINGS FROM ABOVE WITH ENGINEER, OWNER, AND ALL OTHER TRADES AND USE INFORMATION OBTAINED TO DEVELOP INSTALLATION TRADE COORDINATION AND GENERAL ARRANGEMENT DRAWINGS INDICATING MECHANICAL EQUIPMENT AND SYSTEM INSTALLATION IN ACCORDANCE WITH ARCHITECTURAL PLANS AND ALLOWING FOR INSTALLATION OF OTHER TRADES.
5. INSTALLATION TRADE COORDINATION DRAWINGS SHALL BE PROVIDED AND SHALL BE TO SCALE (MINIMUM 1/4"=1'), DIMENSIONED DRAWINGS, CLEARLY SHOWING HOW MECHANICAL EQUIPMENT, DUCTWORK, AND PIPING ARE PLANNED TO BE INSTALLED WHILE TAKING ACCOUNT THE WORK OF OTHER TRADES – PLUMBING, ELECTRICAL POWER AND LIGHTING, FIRE PROTECTION, GENERAL CONSTRUCTION AND OTHERS, AND CLEARLY SHOWING STRUCTURAL COMPONENTS AND FIXED BUILDING FEATURES THAT MUST BE ADDRESSED DURING INSTALLATION.
6. IN ADDITION TO PLAN VIEWS, PROVIDE SECTIONS AND 3 DIMENSION DRAWINGS, OR MODELS, CLEARLY ESTABLISHING PLANNED INSTALLATION WORK.
7. PROVIDE SUGGESTIONS AS TO METHODS THAT WOULD SIMPLIFY INSTALLATIONS.
8. REVIEW TRADE COORDINATION PLANS WITH ENGINEER AND OWNER PRIOR TO ORDERING EQUIPMENT, FABRICATING DUCTWORK OR PIPE, AND PRIOR TO ANY INSTALLATION WORK.

TIE-INS:

1. BUILDING SYSTEMS AND EQUIPMENT SERVING AREAS OF THE BUILDING WHICH REMAIN OCCUPIED DURING CONSTRUCTION MUST REMAIN IN OPERATION AND SHALL NOT BE AFFECTED BY CONSTRUCTION WORK.
2. PRIOR TO COMMENCING WORK, ESTABLISH THE EXISTING PERFORMANCE OF AHU11.
3. COORDINATE ALL WORK ON SYSTEMS INTENDED TO REMAIN IN SERVICE DURING CONSTRUCTION WITH THE OWNER AND OTHER TRADES.
4. COORDINATE TIE INS TO EXISTING BUILDING SYSTEMS WITH OWNER AND OTHER TRADES
5. PLAN WORK TO MINIMIZE DISRUPTION TO CONTINUING OPERATION OF THE BUILDING.
6. WORK ON SYSTEMS REMAINING IN OPERATION DURING CONSTRUCTION INCLUDES:
   a. INSTALLATION OF TEMPORARY DUCT CAPS ON DUCT TO ERU-1.
   b. INSTALLATION OF TEMPORARY DUCT CAPS ON SUPPLY AND RETURN DUCTS FOR AHU-10.
   c. INSTALLATION OF TEMPORARY DUCT CAPS ON SUPPLY AND RETURN DUCTS FOR AHU-11.
   d. INSTALLATION OF 3RD FLOOR DUCT CONNECTION TO AHU-10 SUPPLY AND RETURN AIR DUCTS.
   e. INSTALLATION OF 3RD FLOOR DUCT CONNECTION TO AHU-11 SUPPLY AND RETURN AIR DUCTS.
   f. INSTALLATION OF 3RD FLOOR EXHAUST DUCT CONNECTION TO ERU-1.
   g. REPLACEMENT OF SECTION OF SUPPLY DUCT FROM AHU-11 SERVING AUDIOLOGY ROOMS.
   h. REPLACEMENT OF SECTIONS OF ERU-1 EXHAUST DUCT SERVING VARIOUS HOUSEKEEPING AND CANTEEN STORAGE ROOMS.
   i. TIE IN TO HWS/R HEATING SYSTEM.
   j. TIE IN TO STEAM AND CONDENSATE SYSTEMS.

ABBREVIATIONS

A/E	ARCHITECT / ENGINEER
AAV	AUTOMATIC AIR VENT
ACD	AUTOMATIC CONTROL DAMPER,MODULATING
ACD-TP	AUTOMATIC CONTROL DAMPER,TWO POSITION
AD	ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
AFMD	AIR FLOW MEASURING DEVICE
AFW	AIR FOIL WHEEL (FAN)
AHU	AIR-HANDLING UNIT
APD	AIR PRESSURE DROP
BDD	BACKDRAFT DAMPER
BFP	BACKFLOW PREVENTER
BHP	BRAKE HORSEPOWER
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNIT PER HOUR
C	CENTIGRADE (CELCIUS)
CFM	CUBIC FEET PER MINUTE
COP	COEFFICIENT OF PERFORMANCE
CV	CONSTANT VOLUME
D	DAMPER – AUTOMATIC
Db	DRY-BULB TEMPERATURE
DDC	DIRECT DIGITAL CONTROLS
DEG	DEGREE
DIA	DIAMETER
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EER	ENERGY EFFICIENCY RATIO
EF	EXHAUST FAN
EG	EXHAUST GRILLE
EJ	EXPANSION JOINT
ESP	EXTERNAL STATIC PRESSURE
EWT	ENTERING WATER TEMPERATURE
EX.	EXISTING
F	FAHRENHEIT
F/SDPR	COMBINATION FIRE SMOKE DAMPER
FA	FREE AREA
FC	FLEXIBLE CONNECTION
FD	FIRE DAMPER
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FTR	FIN TUBE RADIATION
FV	FACE VELOCITY
GPM	GALLONS PER MINUTE
HC	HEATING COIL
HP	HORSEPOWER
HRP	HYDRONIC RADIANT (CEILING) PANEL
HWC	HOT WATER COIL
HWR	HEATING HOT WATER RETURN
HWS	HEATING HOT WATER SUPPLY
HZ	HERTZ
I/O	INPUT/OUTPUT
IAQ	INDOOR AIR QUALITY
ICF	IN-LINE CENTRIFUGAL FAN
IN WC	INCH WATER COLUMN
IN WG	INCH WATER GAUGE
IN-LB	INCH-POUND
KG	KILOGRAM
KPA	KILOPASCAL
KW	KILOWATT
KWH	KILOWATT HOUR
L/s	LITERS PER SECOND
LAT	LEAVING AIR TEMPERATURE
LH	LATENT HEAT
LSD	LINEAR SLOT DIFFUSER
LWT	LEAVING WATER TEMPERATURE
M	METER
MAU	MAKE-UP AIR UNIT
MAV	MANUAL AIR VENT
MAX	MAXIMUM
MBH	1000 BTUH
MIN	MINIMUM
MM	MILLIMETER
NA	NOT APPLICABLE
NC	NOISE CRITERIA
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OR	OPERATING ROOM
P	PUMP
PA	PASCAL
PD	PRESSURE DROP
PG	PRESSURE GAGE
PRV	PRESSURE REGULATING VALVE
PSI	POUNDS PER SQUARE INCH
PSIG	POUNDS PER SQUARE INCH – GAGE
RA	RETURN AIR
RG	RETURN GRILLE
RH	RELATIVE HUMIDITY
RHC	REHEAT COIL
RPM	REVOLUTIONS PER MINUTE
SA	SUPPLY AIR
SAT	SUPPLY AIR TEMPERATURE
SD	SMOKE DETECTOR
SD	SUPPLY AIR DIFFUSER
SDPR	SMOKE DAMPER
SG	SUPPLY AIR GRILLE
SP	STATIC PRESSURE
T&PCV	TEMPERATURE AND PRESSURE CONTROL VALVE
TAB	TESTING, ADJUSTING, BALANCE
TD	TEMPERATURE DIFFERENCE
TG	TRANSFER GRILLE
TSTAT	THERMOSTAT
TU	TERMINAL UNIT
VAV	VARIABLE AIR VOLUME
VD	VOLUME DAMPER (MANUAL OPPOSED BLADE)
VFD	VARIABLE FREQUENCY DRIVE
VI	VIBRATION ISOLATOR
VIV	VARIABLE INLET VANES
Wb	WET-BULB (TEMPERATURE)

DUCTWORK SYMBOLS

- SUPPLY DUCT (UP & DOWN)
- EXHAUST DUCT (UP & DOWN)
- RETURN DUCT (UP & DOWN)
- ROUND AND SQUARE 4-WAY CEILING DIFFUSERS
- SQUARE 3-WAY CEILING DIFFUSERS
- SQUARE 2-WAY CEILING DIFFUSERS
- SQUARE 1-WAY CEILING DIFFUSERS
- LINEAR SLOT DIFFUSER
- SUPPLY TOP REGISTER OR GRILLE (WALL TYPE)
- EXHAUST OR RETURN CEILING REGISTER OR GRILLE
- EXHAUST OR RETURN BOTTOM REGISTER OR GRILLE (WALL TYPE)
- EXHAUST OR RETURN REGISTER OR TOP GRILLE (WALL TYPE)
- VANED ELBOW & AIR SPLIT TYPE DUCT TAKE-OFF
- CONNECT NEW DUCT TO EXISTING DUCT
- INCLINED RISE, IN DIRECTION OF AIR FLOW
- INCLINED DROP, IN DIRECTION OF AIR FLOW
- LIMIT OF DEMOLITION
- FLEXIBLE CONNECTION, EQUIPMENT, VIBRATION, OR SEISMIC
- VANED ELBOW (PROVIDE ALL SQUARE OR RECTANGULAR ELBOWS WITH VANES EVEN IF SYMBOL IS MISSING)
- VANED ELBOW (SHORT RADIUS)
- STANDARD RADIUS ELBOW (LONG RADIUS)
- NEW DUCT (INSIDE DIMENSIONS: WIDTH x DEPTH)
- EXISTING DUCT TO REMAIN
- EXISTING DUCT TO BE REMOVED
- LOUVER (LOUVER SPECIFIED IN ARCHITECTURAL SECTION.)
- FLEXIBLE DUCTWORK (INSULATED)
- DUCT WITH SOUND LINING
- MANUAL VOLUME DAMPER
- FIRE DAMPER
- BACK DRAFT DAMPER
- COMBINATION FIRE/SMOKE DAMPER
- POINT OF CHANGE IN DUCT CONSTRUCTION BY STATIC PRESSURE CLASS. THE NUMBER ASSIGNS PRESSURE CLASS (IN. OF WATER) WHICH WILL ACCOMMODATE MAXIMUM OPERATING PRESSURE IN THE DUCT SUBSECTION. THE SYMBOL CONTINUES THE ASSIGNMENT UNTIL THE DUCT TERMINATES OR ANOTHER SYMBOL APPEARS. A "N" SUPERSCRIPT INDICATES NEGATIVE PRESSURE.
- AUTOMATIC CONTROL DAMPER MODULATING
- AUTOMATIC CONTROL DAMPER TWO POSITION
- STAINLESS STEEL DUCT
- MANUAL SPLITTER DAMPER
- STANDARD BRANCH SUPPLY OR RETURN, NO SPLITTER (45° TAP)
- DUCT MOUNTED COIL (HOT WATER OR STEAM COIL)
- DUCT MOUNTED COIL (ELECTRIC)

PIPING SYMBOLS

- HWS — HOT WATER SUPPLY
- HWR — HOT WATER RETURN
- HWSE — EXISTING HOT WATER SUPPLY
- HWRE — EXISTING HOT WATER RETURN
- LPS — LOW PRESSURE STEAM
- LPC — LOW PRESSURE CONDENSATE
- EXISTING PIPE TO BE REMOVED

VALVE SYMBOLS

- GATE VALVE – THREADED/FLANGED
- GLOBE VALVE – THREADED/FLANGED
- CHECK VALVE
- WYE STRAINER (WITH BALL VALVE & HOSE CONNECTION)
- FLEXIBLE CONNECTION
- BALL VALVE
- MODULATING CONTROL VALVE
- MODULATING CONTROL BUTTERFLY VALVE
- TWO POSITION CONTROL VALVE
- THREE-WAY MODULATING CONTROL VALVE
- THREE-WAY TWO POSITION CONTROL VALVE
- PRESSURE REGULATING VALVE
- PRESSURE SAFETY VALVE
- CIRCUIT SETTER VALVE
- PRESSURE REDUCING VALVE (PRV)
- STRAINER WITH VALVED DRAIN AND QUICK-COUPLE HOSE CONNECTOR
- WATER LEVEL CONTROLLER
- FLOW METER

DRAWING SYMBOLS

- DETAIL NUMBER / DRAWING NUMBER WHERE DRAWN
- SECTION LETTER / DRAWING NUMBER WHERE SHOWN
- BUILDING NO. WHERE EQUIPMENT IS LOCATED. / EQUIPMENT ABBREVIATION (SUPPLY FAN) / SUPPLY FAN NO. 3 IN BUILDING NO. 26 / TYPICAL UNIT NO.
- BUILDING NO. WHERE EQUIPMENT IS LOCATED / ITEM (TERMINAL UNIT SHOWN) / ITEM NUMBER (TERMINAL UNIT NO. 1) / SERVED BY AIR HANDLER UNIT NO. 1

TERMINAL UNIT SYMBOLS

- CONVECTOR OR RADIATOR (RECESSED)
- CONVECTOR OR RADIATOR (WALL HUNG)
- AIR CURTAIN
- 2'x2' RADIANT CEILING PANEL
- 2'x4' RADIANT CEILING PANEL
- TERMINAL UNIT WITH REHEAT COIL

MECHANICAL SHEET INDEX

M.001	MECHANICAL SYMBOLS AND SHEET INDEX
MD.131	THIRD FLOOR MECHANICAL DUCTWORK DEMOLITION
MD.132	THIRD FLOOR MECHANICAL PIPING DEMOLITION
MH.131	THIRD FLOOR MECHANICAL DUCTWORK PLAN – WEST
MH.132	THIRD FLOOR MECHANICAL DUCTWORK PLAN – EAST
MH.133	THIRD FLOOR MECHANICAL DUCTWORK PLAN – NORTH
MP.131	THIRD FLOOR MECHANICAL PIPING PLAN
M.501	MECHANICAL DETAILS
M.502	MECHANICAL DETAILS
M.503	MECHANICAL DETAILS
M.601	MECHANICAL SCHEDULES
M.602	MECHANICAL SCHEDULES
M.603	MECHANICAL SCHEDULES
M.604	TEMPERATURE CONTROL DIAGRAMS & SEQUENCE OF OPERATION
M.605	TEMPERATURE CONTROL DIAGRAMS & SEQUENCE OF OPERATION

BID DOCUMENTS	04/06/2012
Revisions:	Date

CONSULTANTS:

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MEP PROJECT NO.: U08.09.04

Drawing Title: MECHANICAL NOTES, SYMBOLS AND ABBREVIATIONS

Approved: Project Director

Project Title: OSCAR G. JOHNSON VA MEDICAL CENTER EXPAND MENTAL HEALTH - 3C

Location: IRON MOUNTAIN, MICHIGAN

Date: APRIL 6, 2012 | Checked: GJ | Drawn: JRM

Project Number: 585-09-103

Building Number: No. 1

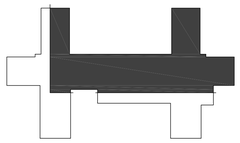
Drawing Number: M.001

Dwg. 25 of 45

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231, OCT 1978



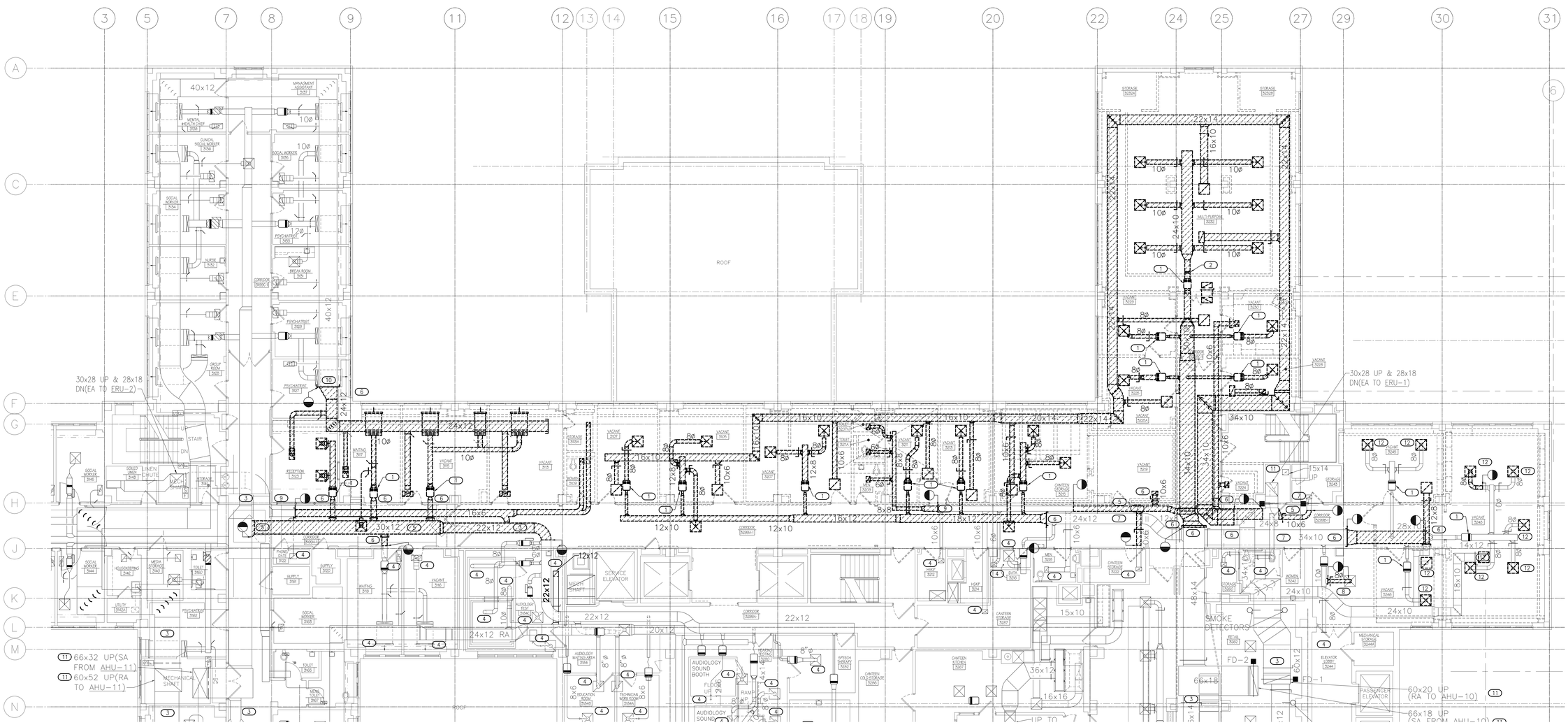
KEY PLAN - THIRD FLOOR
NTS

GENERAL NOTES

1. REMOVE ALL ABANDONED AND NO LONGER USED PIPING, DUCTWORK AND EQUIPMENT; EVEN IF NOT INDICATED TO BE REMOVED ON PLANS. REVIEW ABANDONED AND NO LONGER USED PIPING, DUCTWORK AND EQUIPMENT WITH OWNER AND ENGINEER. COORDINATE WITH OTHER TRADES AS REQUIRED FOR COMPLETE REMOVAL. ABANDONNED AND NO LONGER USED SYSTEMS AND EQUIPMENT OF OTHER TRADES SHOULD BE BROUGHT TO THE ATTENTION OF THE OWNER, ENGINEER AND OTHER TRADES FOR REMOVAL.
2. COMPLETELY REMOVE ALL DUCT AS SHOWN DASHED ALONG WITH TERMINAL UNITS, DAMPERS, HANGERS, AND ASSOCIATED CONTROLS.
3. MECHANICAL CONTRACTOR SHALL REMOVE ALL NO LONGER REQUIRED SMOKE AND FIRE DAMPERS FOUND DURING DEMOLITION WORK IN DUCTWORK, WALLS, FLOORS, ROOFS, SHAFTS, ETC. MECHANICAL CONTRACTOR SHALL MARKUP AN HVAC PLAN INDICATING WHERE SMOKE OR FIRE DAMPERS WERE REMOVED WITH A UNIQUE TAG NUMBER. THE MECHANICAL CONTRATOR SHALL USE THE TAG NUMBER TO CREATE A LIST OF REMOVED SMOKE AND FIRE DAMPERS IDENTIFYING THE TYPE OF DAMPER, LOCATION FROM WHERE REMOVED, AND PROVIDING DAMPER IDENTIFICATION NUMBERS.

KEYED DEMOLITION NOTES

1. REMOVE AND SALVAGE TERMINAL UNIT AND CONTROLS, TURN OVER TO OWNER, COORDINATE WITH OWNERS PROJECT REPRESENTATIVE.
2. REMOVE AND SALVAGE DUCT HUMIDIFIER, CONTROLS, AND HUMIDISTAT. SALVAGE FOR RELOCATION AS PART OF THIS PROJECT WORK.
3. MEASURE AND DOCUMENT DUCT AIRFLOW AND STATIC PRESSURE PRIOR TO START OF CONSTRUCTION PROJECT, PROVIDE DOCUMENTATION TO OWNER AND HVAC SYSTEM ENGINEER.
4. MEASURE AND DOCUMENT GRILLE OR DIFFUSER AIRFLOW PRIOR TO START OF CONSTRUCTION PROJECT, PROVIDE DOCUMENTATION TO OWNER AND HVAC SYSTEM ENGINEER.
5. DUCT SECTION TO REMAIN IN OPERATION SERVING AREAS OF THE BUILDING WHICH REMAIN IN OPERATION DURING CONSTRUCTION PROJECT; PLAN REMOVAL AND cLOSELY COORDINATE AND SCHEDULE REMOVAL OF DUCT SECTION WITH OWNER AND OTHER TRADES. AIR BALANCE TO BE VERIFIED TO BE MAINTAINED AT PRECONSTRUCTION VALUES DURING AND AFTER CONSTRUCTION, REBALANCE AS REQUIRED TO ASSURE NO AFFECT ON EXISTING SYSTEM WHICH REMAINS IN OPERATION. PROVIDE AIR BALANCE DOCUMENTATION TO OWNER AND HVAC SYSTEM ENGINEER.
6. PROVIDE TEMPORARY DUCT CAP DURING CONSTRUCTION, SEAL TO MEET NEW DUCT INSTALLATION SPECIFICATIONS. FOLLOWING INSTALLATION OF DUCT CAP VERIFY THAT AIRFLOWS AND DUCT STATIC PRESSURES IN REMAINING DUCT MATCH MEASURMENTS PRIOR TO INSTALLATION, REBALANCE AS REQUIRED TO ASSURE NO AFFECT ON EXISTING SYSTEM WHICH REMAINS IN OPERATION.
7. MEASURE AIRFLOW PRIOR TO START OF CONSTRUCTION WORK, DIFFUSER TO BE REBALANCED TO SAME AIR FLOW AS FOUND. PROVIDE AIR BALANCE DOCUMENTATION TO OWNER AND HVAC SYSTEM ENGINEER.
8. DISCONNECT AND REMOVE BRANCH DUCT TO DIFFUSER, SUPPLY DIFFUSER TO REMAIN FOR REUSE, SEE MH.131. PROVIDE DUCT CAP WHERE DUCT REMOVED.
9. PROVIDE DUCT CAP.
10. MEASURE AND DOCUMENT DUCT STATIC PRESSURE PRIOR TO START OF CONSTRUCTION, PROVIDE DOCUMENTATION OF FINDINGS TO OWNER AND HVAC SYSTEM ENGINEER.
11. PRIOR TO COMMENCING PROJECT WORK, MEASURE AND DOCUMENT AHU10, AHU11, AND ERU-2 PERFORMANCE:
    WORK WITH OWNER TO HAVE CLEAN AIR FILTERS INSTALLED.
    MEASURE SUPPLY, OUTDOOR, RETURN, AND EXHAUST AIRFLOWS.
    MEASURE FILTER PRESSURE LOSS(ES).
    MEASURE STATIC PRESSURE AND DUCT AIR TEMPERATURE AT ALL LOCATIONS WHERE AIRFLOW MEASUREMENTS ARE TAKEN.
    MEASURE DUCT AIRFLOWS FROM THESE UNITS TO OTHER AREAS OF THE BUILDING THAT COULD HAVE AIRFLOW AFFECTED BY THIS PROJECT OR WHERE INDICATED ON PLANS.
    OBTAIN FAN OPERATING DATA – AMPS VOLTS, RPM
    PROVIDE WRITTEN REPORT DOCUMENTING AS FOUND CONDITION OF AHU-10, AHU-11, AND ERU-2
12. DIFFUSER TO BE SALVAGED AND SAVED FOR RELOCATION, SEE 1/MH.132 FOR REINSTALLATION LOCATION.



1 THIRD FLOOR MECHANICAL DUCTWORK DEMOLITION
1/8" = 1'-0"

NORTH

BID DOCUMENTS	04/06/2012
Revisions:	Date

CONSULTANTS:

ARCHITECT/ENGINEERS:

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MEP PROJECT NO.: U08.09.04

Drawing Title	THIRD FLOOR MECHANICAL DUCTWORK DEMOLITION
Approved Project Director	
Project Title	OSCAR G. JOHNSON VA MEDICAL CENTER EXPAND MENTAL HEALTH - 3C
Location	IRON MOUNTAIN, MICHIGAN
Date	APRIL 6, 2012
Checked	GJ
Drawn	JRM
Project Number	585-09-103
Building Number	No. 1
Drawing Number	MD.131
Dwg. 26 of 45	

Office of Construction and Facilities Management
Department of Veterans Affairs

VA FORM 08-6231, OCT 1978

GENERAL NOTES

1. REMOVE PIPING SHOWN DASHED AND CAP AT MAIN. SEE SHEET MH.132 FOR CONNECTION TO EXISTING.
2. REMOVE ALL ABANDONED PIPE, DUCTS, HANGERS AND CONTROLS.

DEMOLITION NOTES

(1) REMOVE AND SALVAGE TERMINAL UNIT AND CONTROLS, TURN OVER TO OWNER, COORDINATE WITH OWNERS PROJECT REPRESENTATIVE.

(2) REMOVE STEAM CONVECTOR, ASSOCIATED VALVES, PIPING, AND CONTROLS, SEE DETAIL 2/MH.503. REMOVE ASSOCIATED STEAM AND CONDENSATE PIPING BACK TO MAIN RISER, CAP AT MAIN. COORDINATE FLOOR AND WALL REPAIR WITH GENERAL CONTRACTOR.

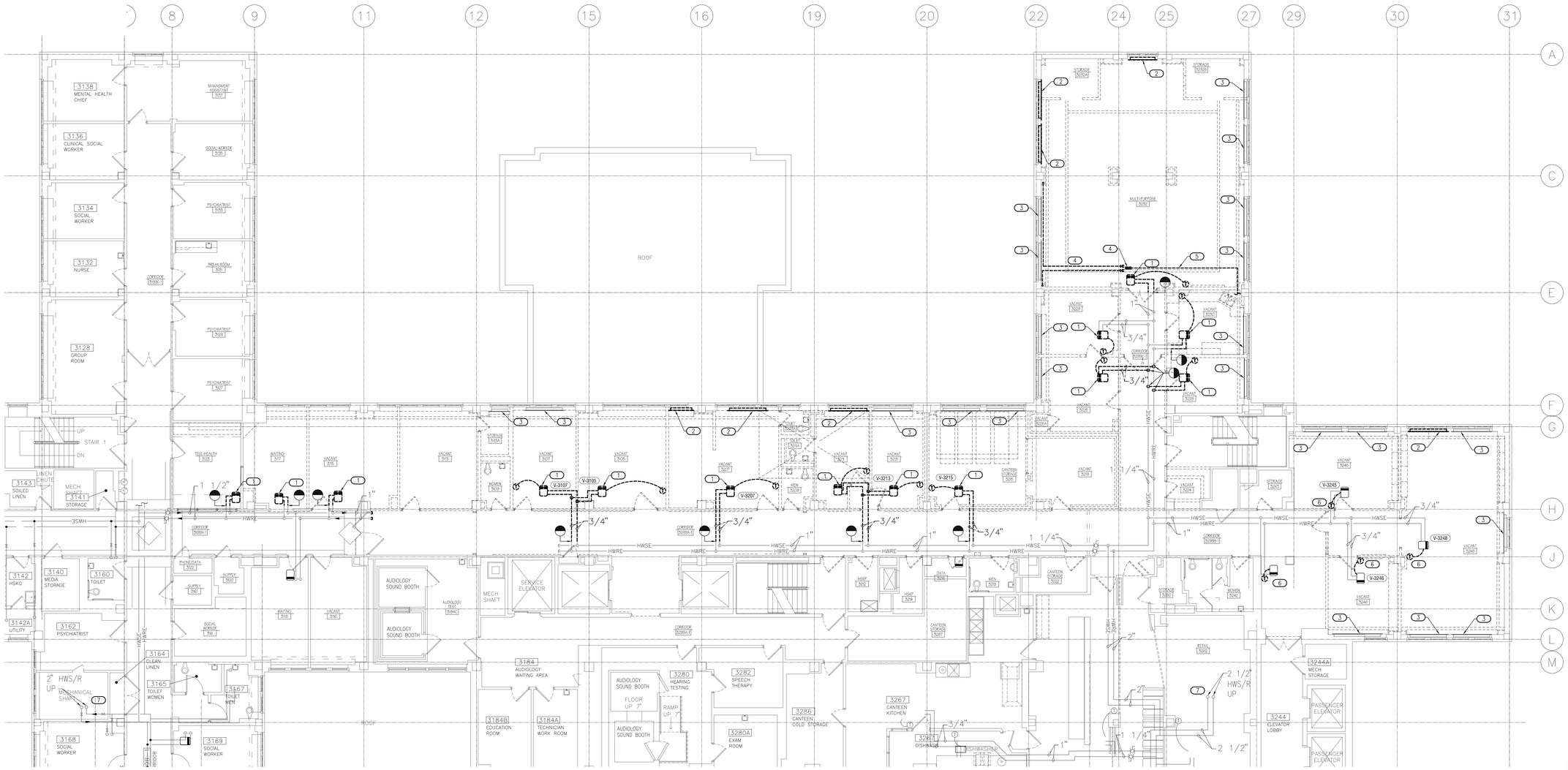
(3) REMOVE CONTROL WIRING FOR STEAM CONVECTOR, WIRING TO BE REPLACED USING CONDUIT HIDDEN IN WALL CAVITY, COORDINATE WITH GENERAL CONTRACTOR.

(4) REMOVE AND SALVAGE DUCT HUMIDIFIER, CONTROLS, AND HUMIDISTAT. SALVAGE FOR RELOCATION AS PART OF THIS PROJECT. REMOVE HUMIDIFIER STEAM AND CONDENSATE PIPING BACK TO MAIN RISERS, CAP AT MAIN TAKING CARE TO ASSURE NO LOW POINTS THAT WILL NOT DRAIN. PATCH, REPAIR, AND FINISH WALL TO MATCH EXISTING.

(5) REMOVE DRAIN LINE BACK TO DRAIN RISER, CAP AT MAIN TAKING CARE TO ASSURE NO LOW POINTS THAT WILL NOT DRAIN. PATCH, REPAIR, AND FINISH WALL TO MATCH EXISTING.

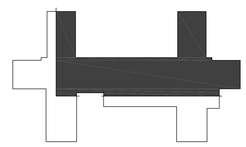
(6) REMOVE THERMOSTAT, SAVE FOR REINSTALLATION IN NEW LOCATION, PATCH, REPAIR, AND FINISH WALL TO MATCH EXISTING.

(7) DOCUMENT EXISTING PERFORMANCE DATA FOR PUMP(S) SERVING HWS/R RISERS SHOWN ON PLAN. NOTE LOCATION OF DIFFERENTIAL PRESSURE SENSOR IN DOCUMENTATION OF FINDINGS PROVIDED TO OWNER AND ENGINEER.



1 THIRD FLOOR MECHANICAL PIPING DEMOLITION
1/8" = 1'-0"

NORTH



KEY PLAN - THIRD FLOOR
NTS

BID DOCUMENTS	04/06/2012
Revisions:	Date

CONSULTANTS:

ARCHITECT/ENGINEERS:

adg
11-005

MEP ASSOCIATES, LLC
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Phone: 715.832.5680 | Fax: 715.832.5668 | www.mepassociates.com
MEP PROJECT NO.: U08.09.04

Drawing Title: THIRD FLOOR MECHANICAL PIPING DEMOLITION

Approved: Project Director

Project Title: OSCAR G. JOHNSON VA MEDICAL CENTER EXPAND MENTAL HEALTH - 3C

Location: IRON MOUNTAIN, MICHIGAN

Date: APRIL 6, 2012 | Checked: GJ | Drawn: JRM

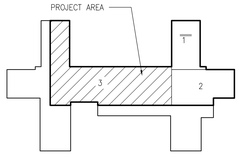
Project Number: 585-09-103

Building Number: No. 1

Drawing Number: MD.132
Dwg. 27 of 45

Office of Construction and Facilities Management
Department of Veterans Affairs

VA FORM 08-6231, OCT 1978



KEY PLAN - THIRD FLOOR

NORTH

GENERAL NOTES

1. COORDINATE WITH OTHER TRADES.
2. PROVIDE TRADE COORDINATION AND GENERAL ARRANGEMENT DRAWINGS PRIOR TO ORDERING EQUIPMENT, SHOP FABRICATION, OR INSTALLATION WORK.
3. PROVIDE ALL SHEET METAL, DUCT WORK SPECIALTIES, EQUIPMENT, INSULATION, AND ASSOCIATED CONTROLS INDICATED ON PROJECT DRAWINGS.
4. CLOSELY COORDINATE AND SCHEDULE WORK RELATED TO CONNECTION TO OPERATING SYSTEMS SERVING OTHER PARTS OF BUILDING WITH OWNER AND OTHER TRADES.

KEYED NOTES

1. PROVIDE TERMINAL UNIT WITH HEAT COIL, SEE DETAIL 1/M.501.
2. PROVIDE HUMIDIFIER INSTALLED IN STAINLESS DUCT SECTION, SEE DETAIL 3/M.503.
3. INSTALL SALVAGED HUMIDIFIER IN STAINLESS DUCT SECTION. SEE DETAIL 3/M.503.
4. PROVIDE AIRFLOW MEASURING STATION, INSTALL WITH MANUFACTURERS RECOMMENDED STRAIGHT DUCT LENGTHS UP AND DOWN STREAM.
5. PROVIDE EXHAUST DUCT AIR VALVE.
6. REWIRE STEAM CONVECTOR CONTROLS WITH CONDUIT CONCEALED IN WALL CAVITY.
7. REMOVE TEMPORARY DUCT CAP, PLAN CAP REMOVAL AND CLOSELY COORDINATE AND SCHEDULE CONNECTION OF NEW DUCTWORK WITH OWNER AND OTHER TRADES.
8. PROVIDE BRANCH DUCT TO EXISTING SUPPLY DIFFUSER, REBALANCE SUPPLY DIFFUSER AIRFLOW.
9. DUCT SECTION REMAINS IN OPERATION DURING CONSTRUCTION, PLAN REPLACEMENT AND CLOSELY COORDINATE AND SCHEDULE INSTALLATION OF DUCT SECTION WITH OWNER AND OTHER TRADES.
10. FOLLOWING COMPLETION OF CONSTRUCTION PROJECT MEASURE GRILLE OR DIFFUSER AIRFLOW, ADJUST TO MATCH AIRFLOW MEASURED PRIOR TO CONSTRUCTION PROJECT, DOCUMENT FINDINGS AND FINAL SETTING. PROVIDE DOCUMENTATION OF FINDINGS TO OWNER AND HVAC SYSTEM ENGINEER.
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    - MEASURE SUPPLY, OUTDOOR, RETURN, AND EXHAUST AIRFLOWS
    - MEASURE FILTER PRESSURE LOSS(ES)
    - MEASURE STATIC PRESSURE AND DUCT AIR TEMPERATURE AT ALL LOCATIONS WHERE AIRFLOW MEASUREMENTS WERE TAKEN
    - MEASURE DUCT AIRFLOWS FROM THESE UNITS TO OTHER AREAS OF THE BUILDING THAT COULD HAVE AIRFLOW AFFECT BY THIS PROJECT OR AS INDICATED ON PLANS
    - OBTAIN FAN OPERATING DATA – AMPS VOLTS, RPM
    - PROVIDE WRITTEN REPORT DOCUMENTING AS LEFT CONDITION OF AHU-10, AHU-11, AND ERU-2
14. PROVIDE DUCT CAP.
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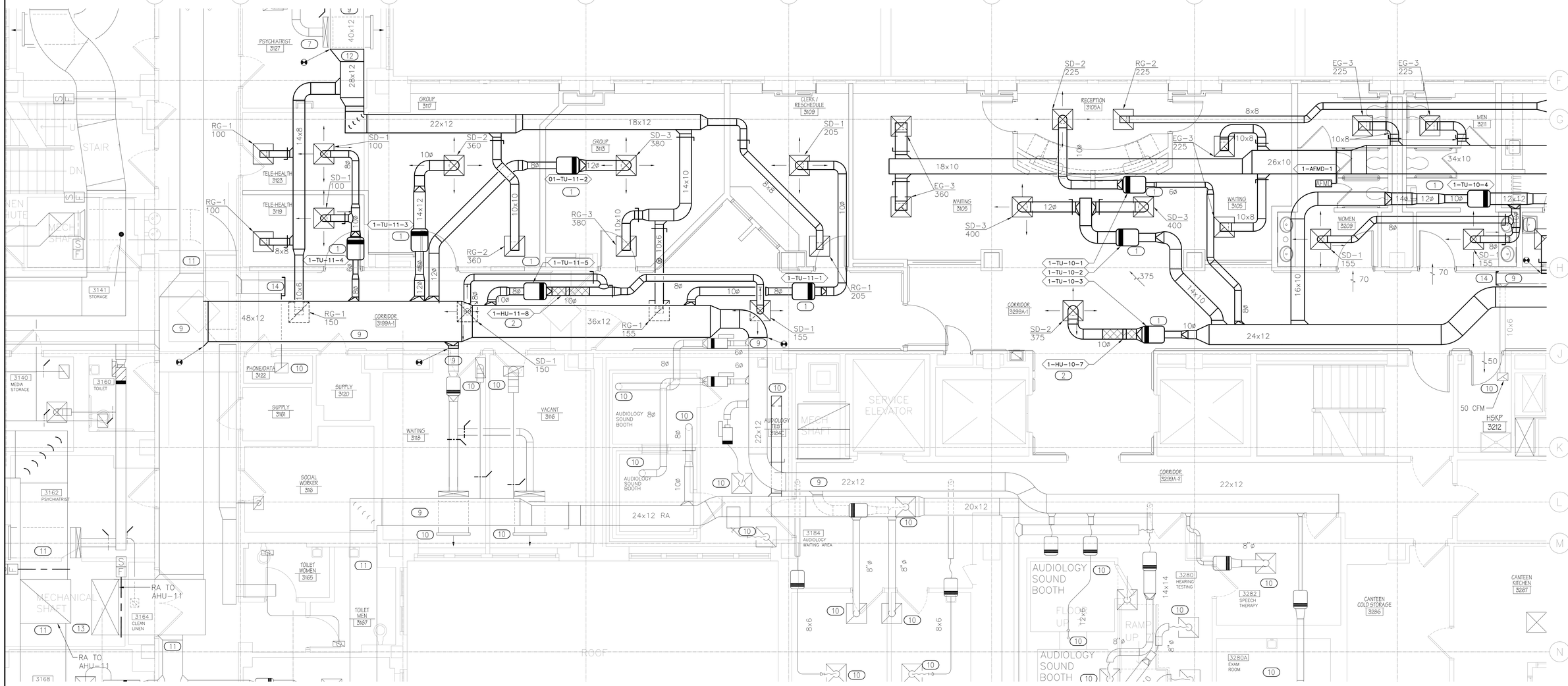

1 THIRD FLOOR MECHANICAL DUCTWORK PLAN

1/4" = 1'-0"

NORTH

BID DOCUMENTS	04/06/2012
Revisions:	Date

CONSULTANTS:

ARCHITECT/ENGINEERS:

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MEP PROJECT NO.: U08.09.04

Drawing Title	THIRD FLOOR MECHANICAL DUCTWORK PLAN
Approved: Project Director	
Project Title	OSCAR G. JOHNSON VA MEDICAL CENTER EXPAND MENTAL HEALTH - 3C
Location	IRON MOUNTAIN, MICHIGAN
Date	APRIL 6, 2012
Checked	GJ
Drawn	JRM
Project Number	585-09-103
Building Number	No. 1
Drawing Number	MH.131
	Dwg. 28 of 45

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231, OCT 1978

GENERAL NOTES

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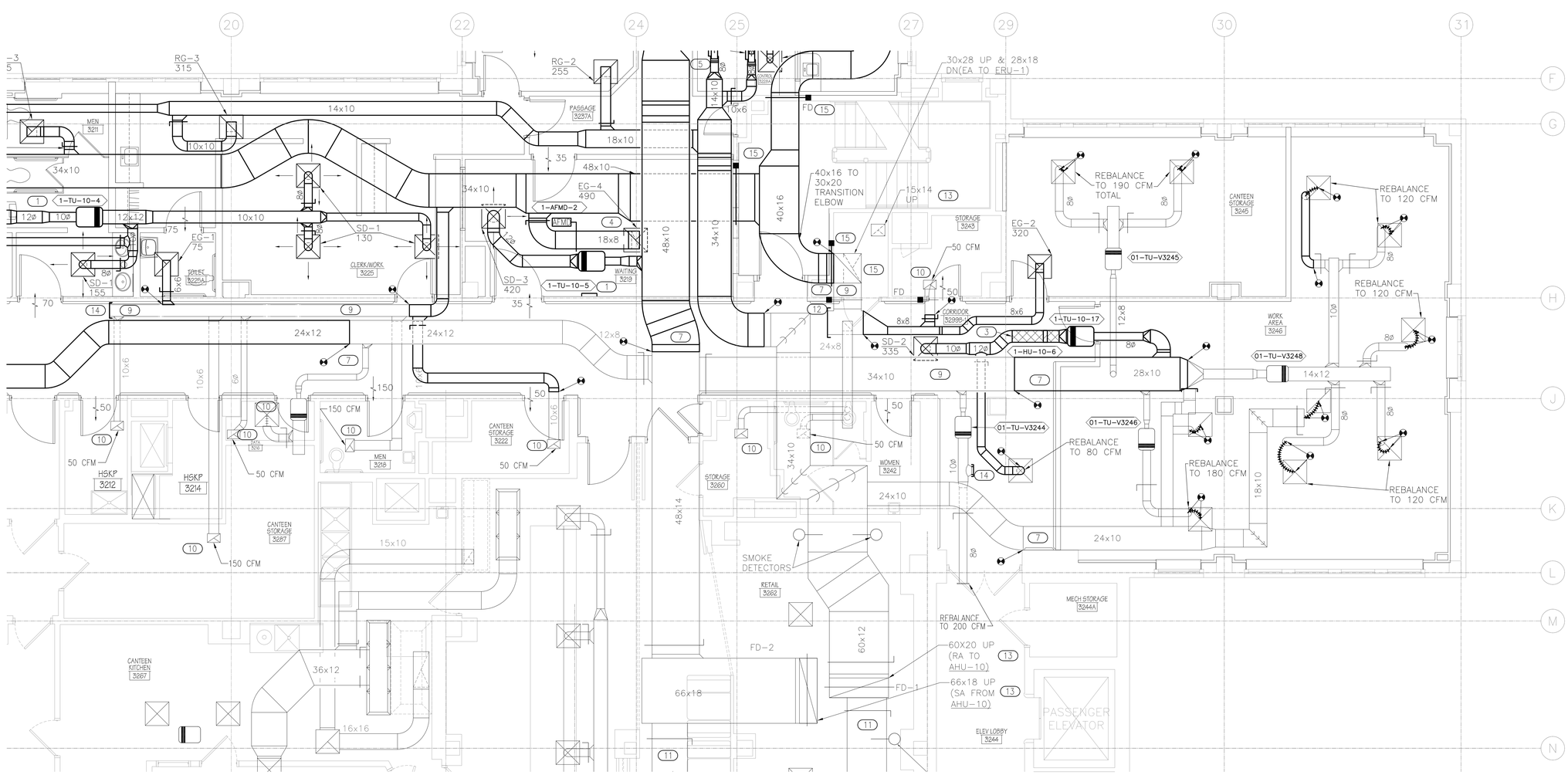
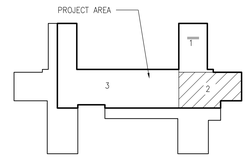


1 THIRD FLOOR MECHANICAL DUCTWORK PLAN
1/4" = 1'-0"

NORTH



KEY PLAN - THIRD FLOOR

NORTH

BID DOCUMENTS	04/06/2012
Revisions:	Date

CONSULTANTS:

ARCHITECT/ENGINEERS:

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MEP PROJECT NO.: U08.09.04

Drawing Title	THIRD FLOOR MECHANICAL DUCTWORK PLAN
Approved: Project Director	
Project Title	OSCAR G. JOHNSON VA MEDICAL CENTER EXPAND MENTAL HEALTH - 3C
Location	IRON MOUNTAIN, MICHIGAN
Date	APRIL 6, 2012
Checked	GJ
Drawn	JRM
Project Number	585-09-103
Building Number	No. 1
Drawing Number	MH.132
Dwg. 29 of 45	

Office of Construction and Facilities Management
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VA FORM 08-6231, OCT 1978

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(6) REWIRE STEAM CONVECTOR CONTROLS WITH CONDUIT CONCEALED IN WALL CAVITY.

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(14) PROVIDE DUCT CAP.

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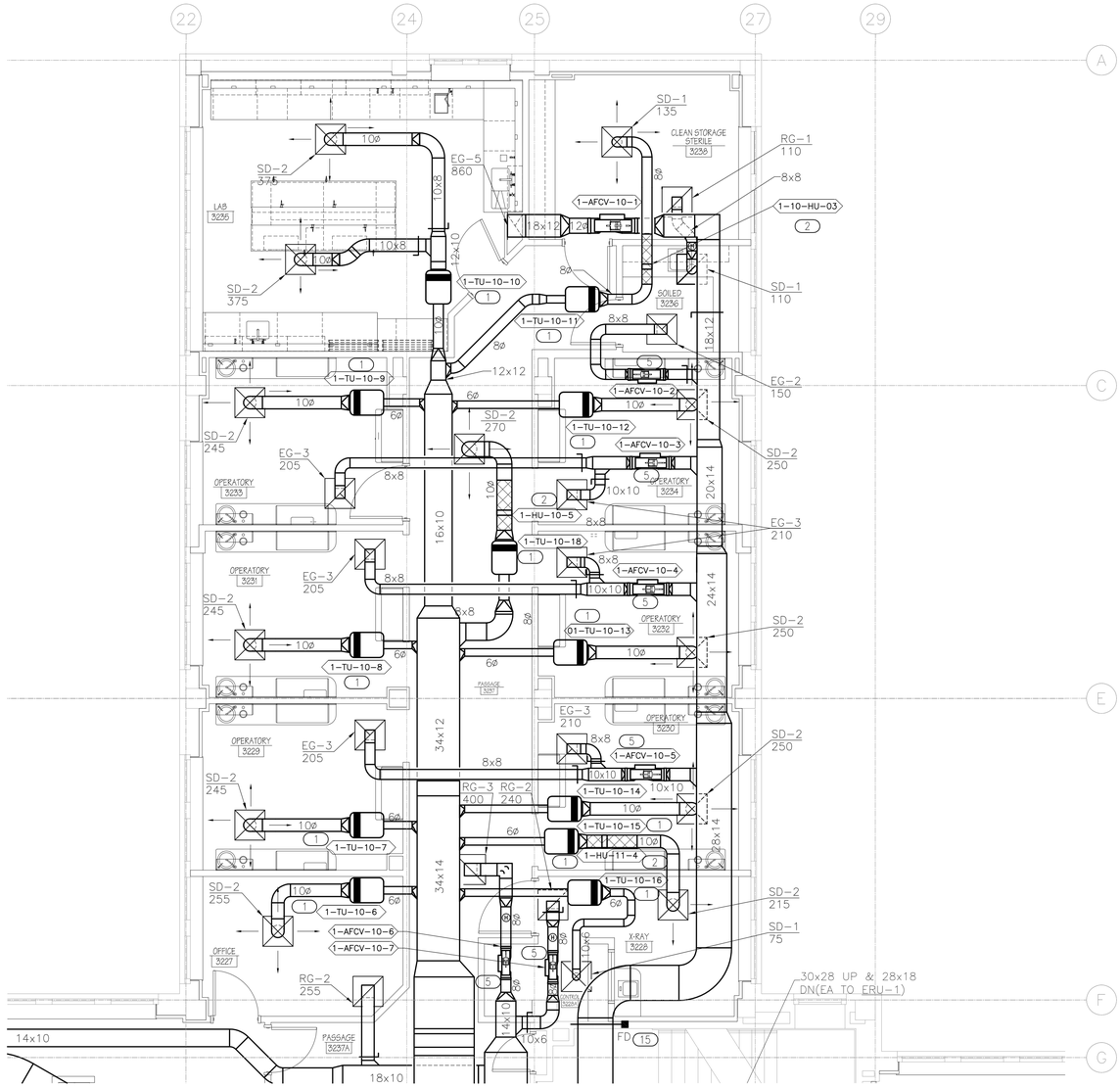
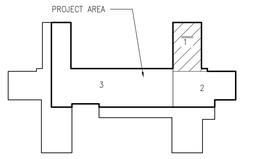


1 THIRD FLOOR MECHANICAL DUCTWORK PLAN
1/4" = 1'-0"

NORTH



KEY PLAN - THIRD FLOOR

NORTH

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MEP PROJECT NO.: U08.09.04

Drawing Title: THIRD FLOOR MECHANICAL DUCTWORK PLAN

Approved: Project Director

Project Title: OSCAR G. JOHNSON VA MEDICAL CENTER EXPAND MENTAL HEALTH - 3C

Location: IRON MOUNTAIN, MICHIGAN

Date: APRIL 6, 2012 | Checked: GJ | Drawn: JRM

Project Number: 585-09-103

Building Number: No. 1

Drawing Number: MH.133

Dwg. 30 of 45

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231, OCT 1978

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KEYED NOTES

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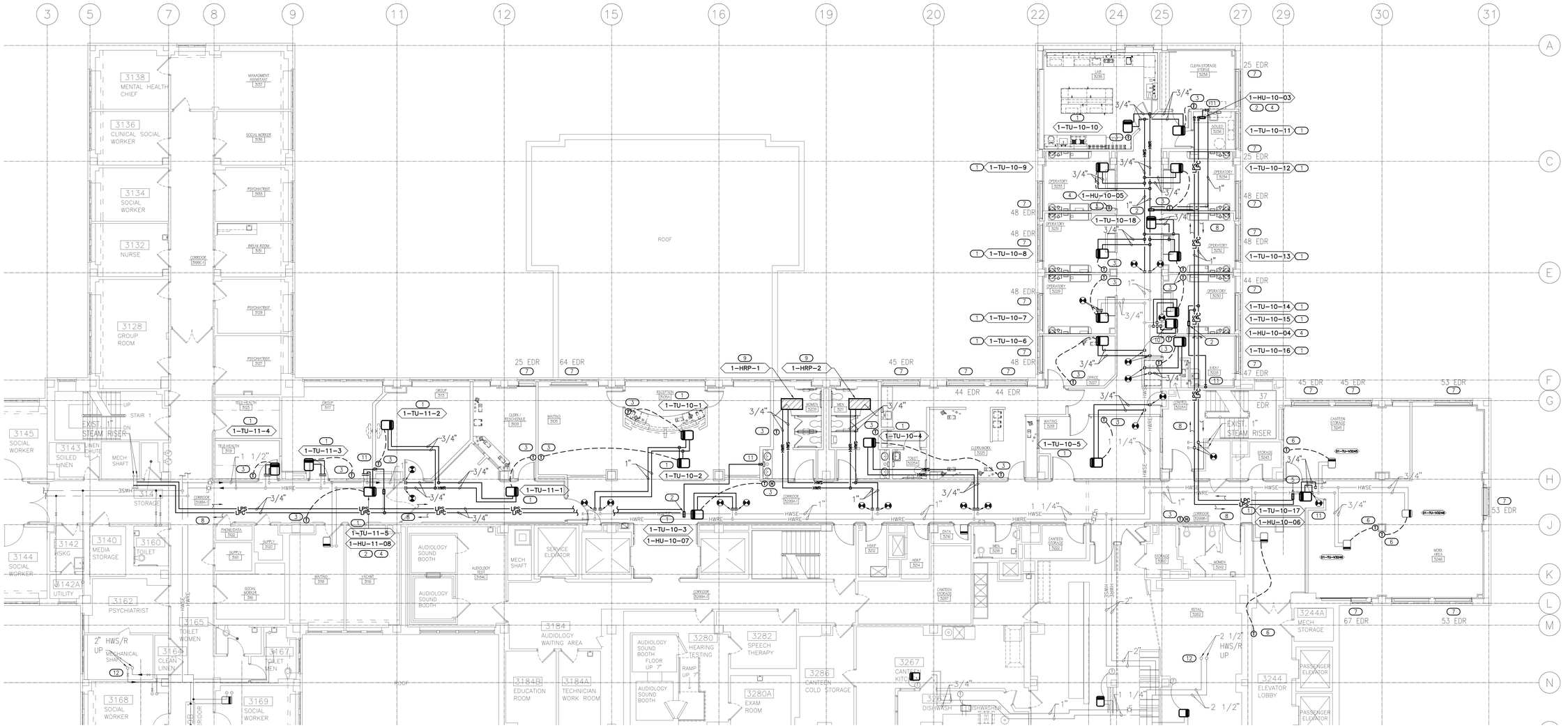
2. PROVIDE HUMIDIFIER INSTALLED IN STAINLESS DUCT SECTION, SEE DETAILS 1&3/MH.503 FOR ADDITIONAL INFORMATION.
3. PROVIDE THERMOSTAT AND/OR HUMIDISTAT. COORDINATE EXACT LOCATION OF THERMOSTAT WITH OWNER.
4. SEE MECHANICAL DUCTWORK PLANS FOR DUCT MOUNTED HUMIDISTAT LOCATIONS.
5. INSTALL SALVAGED HUMIDIFIER IN STAINLESS DUCT SECTION, SEE DETAILS 1&3/MH.503 FOR ADDITIONAL INFORMATION.
6. INSTALL RELOCATED THERMOSTAT.
7. REWIRE STEAM CONVECTOR CONTROLS WITH CONDUIT CONCEALED IN WALL CAVITY.
8. PROVIDE STEAM SUPPLY AND CONDENSATE PIPING FROM STEAM AND CONDENSATE RISERS. RUN STEAM PIPING AS HIGH AS POSSIBLE. CONTINUOUSLY SLOPE STEAM AND CONDENSATE PIPING IN DIRECTION OF FLOW, PLAN AND COORDINATE STEAM AND CONDENSATE PIPE ROUTES WITH OTHER TRADES.
9. PROVIDE RADIANT CEILING PANEL. SEE DETAIL 6/MH.502 FOR ADDITIONAL PIPING INFORMATION.
10. PROVIDE PIPE CAP.
11. ROUTE 1" DUCT DRAIN TO NEAREST OPEN SITE. COORDINATE DRAIN LOCATION WITH PLUMBING PLAN PL.231.
12. FOLLOWING COMPLETION OF CONSTRUCTION PROJECT VERIFY PUMP PERFORMANCE DATA TO INFORMATIONAL DATA TAKEN PRIOR TO CONSTRUCTION. PROVIDE DOCUMENTATION OF FINDINGS TO THE OWNER AND ENGINEER.



1 THIRD FLOOR MECHANICAL PIPING PLAN
1/8" = 1'-0"

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KEY PLAN - THIRD FLOOR
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Dwg. 31 of 45

Office of Construction and Facilities Management

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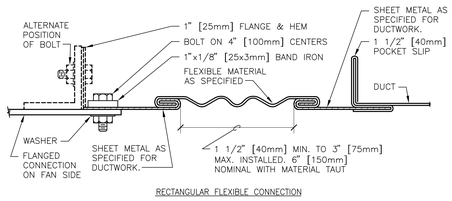
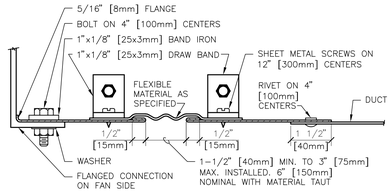
VA FORM 08-6231, OCT 1978



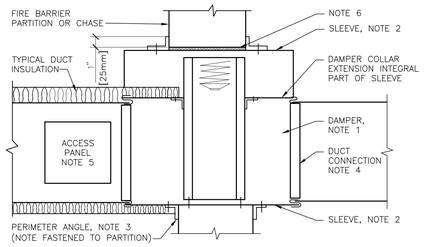
RECTANGULAR FLEXIBLE CONNECTION



ROUND FLEXIBLE CONNECTION

4 FLEXIBLE DUCT CONNECTIONS

NTS

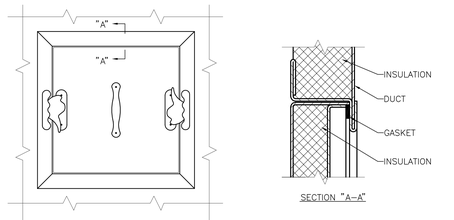


NOTE:

1. A VERTICAL DAMPER IS SHOWN. HORIZONTAL DAMPER INSTALLATION, IS SIMILAR. FOLLOW DAMPER MANUFACTURER'S INSTRUCTIONS, INCLUDING FASTENER OPTIONS AND GAGES FOR SLEEVE AND PERIMETER ANGLES. FIRE DAMPERS MUST BE INSTALLED IN THE PARTITION OR FLOOR AND NOT OUTSIDE THE PENETRATION.
2. GALVANIZED SLEEVE: GAGE NOT LESS THAN CONNECTING DUCT. FASTEN SLEEVE TO DAMPER FRAME AND TO PERIMETER ANGLES.
3. PERIMETER ANGELS: GALVANIZED STEEL, NOT LESS THAN 1 1/2"x1 1/2" [40x40mm], 14 GAGE, TO PROVIDE 1" [25mm] MINIMUM OVERLAP OF OPENING ON ALL 4 SIDES.
4. BREAKAWAY DUCT CONNECTION: CONTRACTOR'S OPTION OF TYPES SHOWN IN SMACNA. ACCESS PANELS: SIZE AND LOCATION TO PERMIT SERVICING THE FUSIBLE LINK OR LINKS.
5. PROVIDE 1/4" TO 1/2" [6 TO 15mm] CLEARANCE ON HEIGHT AND WIDTH. FILL OPEN SPACE WITH ROCK WOOL FIRESTOP FIBER.
6. ALL DUCT WORK RISERS WHICH ARE RUN EXPOSED, SUCH AS THRU ATTIC FLOORS AND MECHANICAL ROOM FLOORS, SHALL BE PROVIDED WITH 3" [75mm] HIGH
7. CONCRETE CURB AROUND OPENING FOR DUCT.

3 SECTION THRU FIRE DAMPER INSTALLATION

NTS

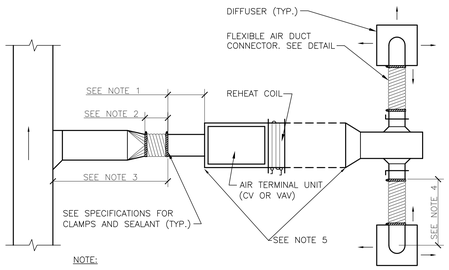


NOTES:

1. LATCHES SHALL BE OF THE WEDGE TYPE TO CLOSE DOORS TIGHTLY.
2. HINGES ON THE ACCESS DOORS SHALL HAVE NON-CORROSIVE PINS.
3. SEE SMACNA 2005, FIGURE 9-15
4. PROVIDE DUCT ACCESS DOOR EVERY 20'-0" OR CHANGE IN DUCT DIRECTION AND AT FIRE DAMPERS.

2 ACCESS PANEL AND DOOR DETAIL

NTS

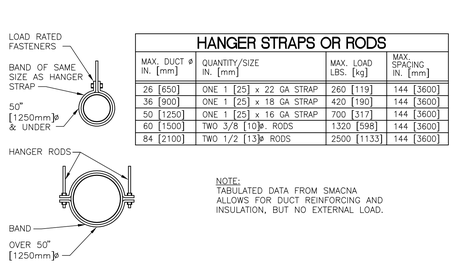


NOTE:

1. RIGID STRAIGHT TERMINAL UNIT LENGTH SHALL BE A MINIMUM OF 3 TIMES THE DIAMETER OF THE TERMINAL UNIT INLET, WITH NO FITTINGS, STRAIGHT DUCT ONLY.
2. A FLEXIBLE AIR DUCT CONNECTOR IS NOT MANDATORY FOR INLET TO THIS BOX, BUT ALLOWED TO ACCOMMODATE MINOR OFFSETS. MAXIMUM LENGTH 3'-0" [900mm].
3. A BRANCH DUCT SERVING AN INDIVIDUAL BOX MAY BE THE SAME SIZE AS THE BOX INLET, PROVIDED THE EQUIVALENT LENGTH OF THE BRANCH DUCT, AS SHOWN, DOES NOT EXCEED 10 FEET (3 METERS). FOR LONGER LENGTHS, INCREASE THE DUCT SIZE AND PROVIDE A DUCT TRANSITION TO MAINTAIN THE DUCT STATIC PRESSURE DROP AT OR BELOW 0.2"/100' [1.64Pa/m].
4. FLEXIBLE AIR DUCT CONNECTORS, WHEN USED FROM TERMINAL UNIT SUPPLY AIR DUCT TO DIFFUSER, SHALL NOT EXCEED 5'-0" [1500mm]. USE RIGID ELBOWS FOR CHANGE OF DIRECTION GREATER THAN 45°.
5. COMPONENT ARRANGEMENT MAY VARY BY MANUFACTURER. PROVIDE INSULATION W/VAPOR BARRIER FOR CONNECTING DUCT SECTIONS.
6. USE OF THE FLEXIBLE AIR DUCT CONNECTORS ARE NOT PERMITTED FOR THE DEDICATED AHU SERVING THE SURGICAL SUITE.

1 DUCT CONNECTIONS - AIR TERMINAL UNITS

NTS

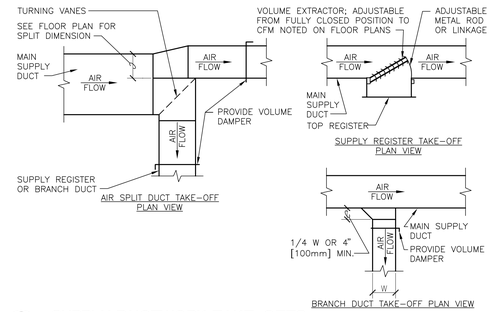


HANGER STRAPS OR RODS			
MAX. DUCT ø IN. [mm]	QUANTITY/SIZE IN. [mm]	MAX. LOAD LBS. [kg]	MAX. SPACING IN. [mm]
26 [650]	ONE 1 [25] x 22 GA STRAP	260 [119]	144 [3600]
36 [900]	ONE 1 [25] x 18 GA STRAP	420 [190]	144 [3600]
50 [1250]	ONE 1 [25] x 16 GA STRAP	700 [317]	144 [3600]
60 [1500]	TWO 3/8 [10]ø. RODS	1320 [598]	144 [3600]
84 [2100]	TWO 1/2 [13]ø RODS	2500 [1133]	144 [3600]

NOTE:
TABULATED DATA FROM SMACNA ALLOWS FOR DUCT REINFORCING AND INSULATION, BUT NO EXTERNAL LOAD.

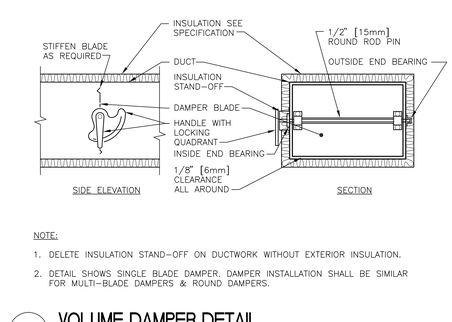
8 ROUND DUCT HANGERS

NTS



7 SUPPLY DUCTWORK TAKE-OFFS

NTS

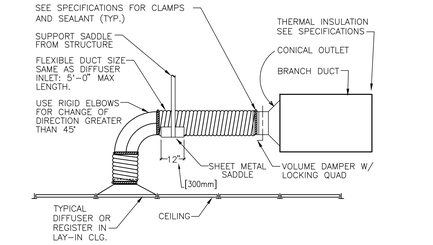


NOTE:

1. DELETE INSULATION STAND-OFF ON DUCTWORK WITHOUT EXTERIOR INSULATION.
2. DETAIL SHOWS SINGLE BLADE DAMPER. DAMPER INSTALLATION SHALL BE SIMILAR FOR MULTI-BLADE DAMPERS & ROUND DAMPERS.

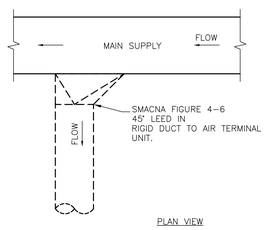
6 VOLUME DAMPER DETAIL

NTS



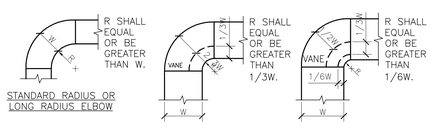
5 FLEXIBLE AIR DUCT CONNECTOR

NTS



13 SUPPLY DUCT TAKEOFF - AIR TERMINAL UNITS

NTS

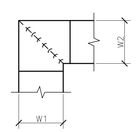


NOTE:

1. THE INTERIOR SURFACE OF ALL RADIUS ELBOWS SHALL BE MADE ROUND.
2. ALL STANDARD RADIUS ELBOWS CAN BE SUBSTITUTED WITH SHORT RADIUS ELBOWS. ALL SHORT RADIUS ELBOWS SHALL HAVE VANES. VANES SHALL BE CONSTRUCTED, SUPPORTED AND FASTENED AS RECOMMENDED BY SMACNA.

12 DUCTWORK RADIUS ELBOWS

NTS

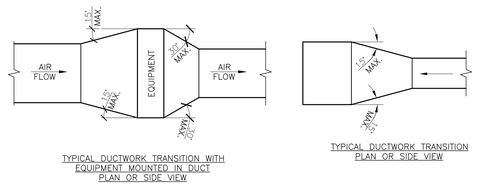


NOTE:

1. ALL VANE ELBOWS SHALL BE CONSTRUCTED AND INSTALLED AS DETAILED BY SMACNA.
2. WHEN W1 DOES NOT EQUAL W2, VANE SHALL BE SINGLE THICKNESS VANE TYPE REGARDLESS OF W DIMENSION.
3. ALL SINGLE THICKNESS VANES SHALL HAVE A 2" [50mm] RADIUS, 1 1/2" [40mm] MAXIMUM SPACE BETWEEN VANES AND A 3/4" [20mm] TRAILING EDGE.
4. WHEN W EQUALS W2 AND W1 IS GREATER THAN 20" [500mm] VANES SHALL BE DOUBLE VANE TYPE.

11 DUCTWORK SQUARE VANE ELBOWS

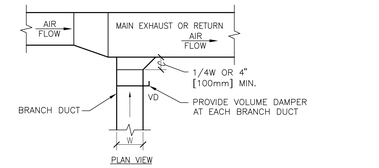
NTS



NOTE:
UNLESS OTHERWISE INDICATED ON PLANS, MAXIMUM ANGLES SHOWN SHALL APPLY.

10 DUCTWORK TRANSITIONS (WITH EQUIPMENT MOUNTED IN DUCT)

NTS



9 EXHAUST OR RETURN BRANCH DUCTWORK

NTS

BID DOCUMENTS	04/06/2012
Revisions:	Date

CONSULTANTS:

ARCHITECT/ENGINEERS:

adg

11-005

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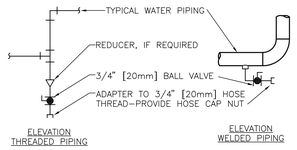
MEP PROJECT NO.: U08.09.04

Drawing Title	MECHANICAL DETAILS
Approved: Project Director	
Project Title	OSCAR G. JOHNSON VA MEDICAL CENTER EXPAND MENTAL HEALTH - 3C
Location	IRON MOUNTAIN, MICHIGAN
Date	APRIL 6, 2012
Checked	GJ
Drawn	JRM
Project Number	585-09-103
Building Number	No. 1
Drawing Number	M.501
Dwg. 32 of 45	

Office of Construction and Facilities Management

Department of Veterans Affairs

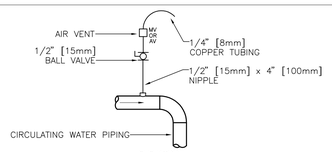
VA FORM 08-6231, OCT 1978



TYPICAL CHILLED AND HOT WATER PIPING DRAIN VALVE CONNECTIONS

NOTES:
1. DRAIN ALL LOW POINTS AS INDICATED ABOVE.

2. WHERE SCALE POCKETS ARE SHOWN ON PIPE RISER DIAGRAMS AND/OR PLANS LOCATE DRAIN AT BOTTOM OF SCALE POCKET.

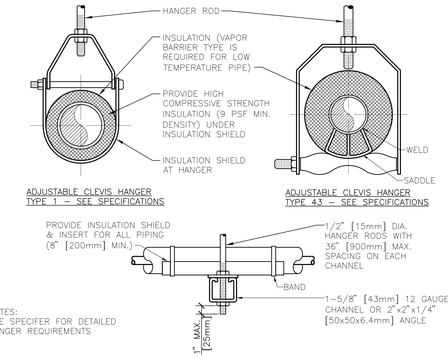


TYPICAL MANUAL AIR VENT

NOTES:
1. VENT ALL HIGH POINTS INDICATED ABOVE.
2. IF AUTOMATIC AIR VENTS ARE USED, PIPE DISCHARGE TO DRAIN.

2 DRAIN VALVE AND AIR VENT CONNECTIONS (HYDRONIC SYSTEMS)

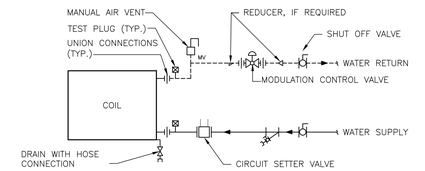
NTS



MAXIMUM PIPE/TUBING SUPPORT SPACING																		
NOM. SIZE	IN. [mm]	THRU 3/4 THRU [20]	1 [25]	1 1/4 [32]	1 1/2 [40]	2 [50]	2 1/2 [65]	3 [75]	4 [100]	5 [125]	6 [150]	8 [200]	10 [250]	12 [300]	14 [350]	16 [400]	18 [450]	20 [500]	24 [600]
PIPE	FT. [mm]	7 [2100]	7 [2100]	7 [2100]	9 [2700]	10 [3000]	11 [3400]	12 [3700]	14 [4100]	16 [4900]	17 [5200]	19 [5800]	22 [6700]	23 [7000]	25 [7600]	27 [8200]	28 [8500]	30 [9100]	32 [9600]
TUBING	FT. [mm]	5 FT [1500]	6 [1800]	7 [2100]	8 [2400]	8 [2400]	9 [2700]	10 [3000]	12 [3700]	13 [4000]	14 [4100]	16 [4900]	–	–	–	–	–	–	–
NOTE: FOR TRAPEZE HANGER TAKE SPACING OF SMALLEST SIZE ON TRAPEZE.																			

1 PIPE HANGERS

NTS



HYDRONIC RADIANT CEILING PANELS - PIPING CONNECTIONS

4 NTS

TERMINAL UNIT WATER COILS - PIPING CONNECTIONS

3 NTS

BID DOCUMENTS	04/06/2012
Revisions	Date

CONSULTANTS:

ARCHITECT/ENGINEERS:

adg

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MEP PROJECT NO.: U08.09.04

11-005

Drawing Title: MECHANICAL DETAILS

Approved: Project Director

Project Title: OSCAR G. JOHNSON VA MEDICAL CENTER EXPAND MENTAL HEALTH - 3C

Location: IRON MOUNTAIN, MICHIGAN

Date: APRIL 6, 2012 | Checked: GJ | Drawn: JRM

Project Number: 585-09-103

Building Number: No. 1

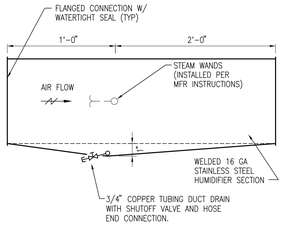
Drawing Number: M.502

Dwg. 33 of 45

Office of Construction and Facilities Management

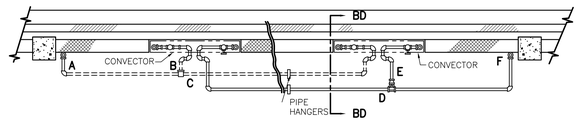
Department of Veterans Affairs

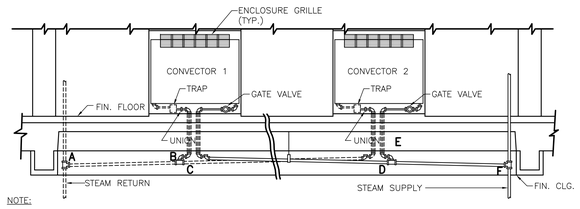
VA FORM 08-6231, OCT 1978

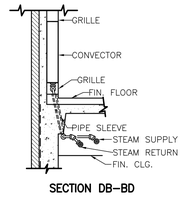


NOTE:
1. INSTALL A TEMPERED GLASS ACCESS DOOR ON THE SIDE OF THE FIRST DUCT OR FITTING DOWN STREAM.
2. DRAIN PIPING INSTALLED PER CODE.
3. PROVIDE LIQUID LEVEL SENSOR IN DUCT DRAIN. CONNECTED SENSOR TO BAS WITH FLUID ALARM.
4. INSTALL DRAIN PIPING TO OPEN SITE AS INDICATED ON PLAN.

3 HUMIDIFIER DUCT DETAIL
NTS



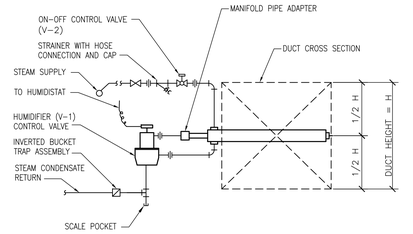




SECTION DB–BD

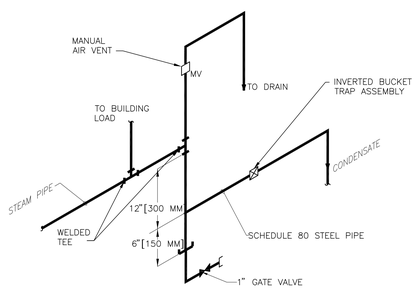
NOTE:
1. REMOVE CONVECTORS PER PLAN.
2. REMOVE STEAM SUPPLY / RETURN PIPE TO RISERS AND CAP AT RISER WHEN POSSIBLE.
3. IF BOTH CONVECTOR 1 AND 2 TO BE REMOVED, REMOVE STEAM SUPPLY BRANCH PIPE TO STEAM SUPPLY RISER AT POINT E. REMOVE STEAM RETURN BRANCH PIPE TO STEAM RETURN RISER, CAP AT POINT A.
4. IF CONVECTOR 1 TO RE REMOVED AND 2 TO REMAIN, REMOVE STEAM SUPPLY BRANCH PIPE FROM CONVECTOR 1 TO POINT D AND CAP, REMOVE STEAM RETURN BRANCH PIPE FROM CONVECTOR 1 TO POINT B AND CAP.
5. SIMILAR IF CONVECTOR 2 REMOVED AND 1 REMAINS
6. COORDINATE FILLING AND FIRESTOPPING OF FLOOR HOLES WITH GENERAL CONTRACTOR
7. REMAINING CONVECTORS: REMOVE BRANCH PIPE FROM FLOOR TO CONVECTOR, INCLUDING VALVES AND TRAP. PROVIDE NEW STEAM ISOLATION VALVE, MODULATING STEAM CONTROL VALVE WITH ELECTRIC VALVE ACTUATOR, AND STEAM FLOAT AND THERMOSTATIC TRAP. COORDINATE WITH CONTROLS CONTRACTOR FOR CONTROL VALVE.
8. PROVIDE CONTROLS INTEGRATING RADIATOR VALVE OPERATION AS SECOND STAGE OF HEAT IN THE SPACE (FIRST STAGE BEING THE HEAT COIL DOWNSTREAM OF THE AIR TERMINAL UNIT). CONTROL WIRING SHALL BE IN CONDUIT, IN WALL CAVITY.
9. TRAP TO BE SIZED BASED ON A 3 TIMES FLOW SAFETY FACTOR AND 0.25 PSIG PRESSURE DROP.
10. PROVIDE AS LONG AS POSSIBLE STATIC HEAD ABOVE TRAP.
11. PLAN INSTALLATION PRIOR TO ORDERING ANY MATERIALS. CHECK DIMENSIONS AGAINST AVAILABLE SPACE.

2 STEAM CONVECTORS - PIPING CONNECTIONS
NTS

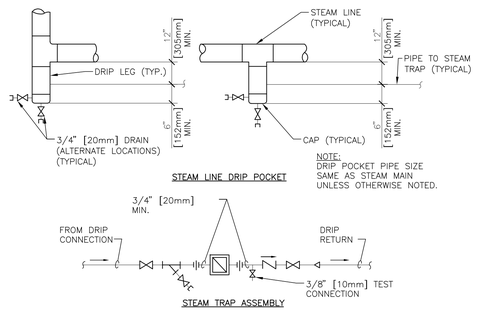


NOTE:
1. INSTALL PIPING PER MANUFACTURERS RECOMMENDATIONS. STEAM SUPPLY AND CONDENSATE DRAIN PIPING SHOULD BE MADE IN ACCORDANCE WITH GOOD PIPING PRACTICE.
2. ALL STEAM CONDENSATE TRAPS SHALL BE ARMSTRONG INVERTED BUCKET TRAPS.
3. MINIMUM 2" DRIP LEG MAY BE INSTALLED PER FIELD CONDITIONS.
4. SEE MANUFACTURERS PIPING RECOMMENDATIONS FOR FINAL PIPING ARRANGEMENT.

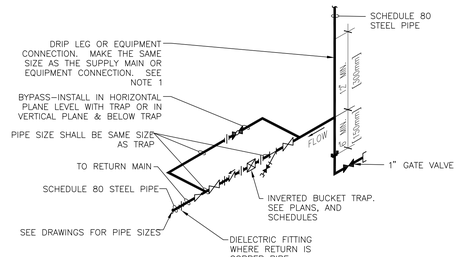
1 STEAM HUMIDIFIER PIPING CONNECTIONS
NTS



7 END OF STEAM LINE DRIP TRAP
NTS

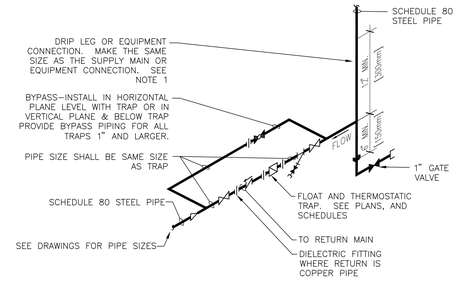


6 STEAM LINE DRIP POCKET STEAM TRAP ASSEMBLY
NTS



NOTE:
1. ALL DRIP POINTS ON STEAM MAINS SHALL BE PROVIDED WITH A 12" MINIMUM HIGH DRIP LEG FROM BOTTOM OF STEAM MAIN TO TRAP INLET. DRIP LEG SHALL HAVE 6" SCALE POCKET BELOW TRAP INLET.
2. PROVIDE BYPASS PIPING.

5 INVERTED BUCKET STEAM TRAP ASSEMBLY
NTS



NOTE:
1. ALL DRIP POINTS ON STEAM MAINS SHALL BE PROVIDED WITH A 12" MINIMUM HIGH DRIP LEG FROM BOTTOM OF STEAM MAIN TO TRAP INLET. DRIP LEG SHALL HAVE 6" SCALE POCKET BELOW TRAP INLET.

4 FLOAT AND THERMOSTATIC STEAM TRAP ASSEMBLY
NTS

ALL ITEMS THAT REQUIRE ACCESS, SUCH AS FOR OPERATING, CLEANING, SERVICING, MAINTENANCE, AND CALIBRATION, SHALL BE EASILY AND SAFELY ACCESSIBLE.

BID DOCUMENTS	04/06/2012
Revisions:	Date

CONSULTANTS:

ARCHITECT/ENGINEERS:

adg
11-005

MEP ASSOCIATES, LLC
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MEP PROJECT NO.: U08.09.04

Drawing Title: MECHANICAL DETAILS

Approved: Project Director

Project Title: OSCAR G. JOHNSON VA MEDICAL CENTER EXPAND MENTAL HEALTH - 3C

Location: IRON MOUNTAIN, MICHIGAN

Date: APRIL 6, 2012 | Checked: GJ | Drawn: JRM

Project Number: 585-09-103

Building Number: No. 1

Drawing Number: M.503 Dwg. 34 of 45

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231, OCT 1978

HVAC DESIGN DATA

DESIGN CONDITIONS	SUMMER					WINTER					LOWEST AVERAGE ANNUAL DEWPOINT	
	TEMP		WET BULB TEMP		% HUMIDITY	TEMP		DEWPOINT TEMP		% HUMIDITY		
	°F	[°C]	°F	[°C]		°F	[°C]	°F	[°C]		°F	[°C]
OUTDOOR DESIGN CONDITIONS	90	[32]	75	[24]	46	-25	[-32]	-25	[-32]	N/A	30	[-1]
INDOOR AREA DESIGN CONDITIONS												
CLEAN STERILE STORAGE	73	[23]	62.3	[17]	55	68	[20]	39.4	[4]	35		
CLEAN UTILITY ROOM/STORAGE ROOM	75	[24]	62.5	[17]	50	70	[21]	37.2	[3]	30		
CONFERENCE / GROUP ROOM	75	[24]	62.5	[17]	50	70	[21]	37.2	[3]	30		
CORRIDOR / PASSAGE	65	[18]	54.2	[12]	50	70	[21]	50.5	[10]	50		
DENTAL TREATMENT OPERATORY	70	21-24	58.8	11 - 17	50	75	21-24	41.8	3 - 13	30		
GENERAL LABORATORY - DENTAL	75	[24]	62.5	[17]	50	70	[21]	37.2	[3]	30		
OFFICE	75	[24]	62.5	[17]	50	70	[21]	37.2	[3]	30		
SOILED AREA	N/A		N/A		N/A	N/A		N/A		N/A		
TOILET PUBLIC INTERIOR	77	[25]	64.2	[18]	50	N/A		N/A		N/A		
TOILET PUBLIC PERIMETER	77	[25]	64.2	[18]	50	70	[21]	37.2	[3]	30		
WAITING AND PATIENT ADMITTING	75	[24]	62.5	[17]	50	70	[21]	37.2	[37]	30		
X RAY	75	[24]	62.5	[17]	50	70	[21]	44.6	[37]	40		
X RAY CONTROL ROOM	75	[24]	62.5	[17]	50	70	[21]	44.6	[37]	40		

AIR FLOW CONTROL VALVE SCHEDULE

MARK	LOCATION	SYSTEM AND/OR SERVICE	TYPE	SIZE		DESIGN AIR FLOW		MAX AIR FLOW		APD AT MAX AIR FLOW		CONTROL TYPE	CONNECT TO ECC	APPLICATION	REMARKS
				IN	[mm]	CFM	[L/s]	CFM	[L/s]	IN WG	[Pa]				
1-AFCV1	3238 CLEAN STORAGE STERILE	1-ERU-1 EXHAUST	CV	12	[300]	860	[410]	860	[410]	0.4	[100]	AIRFLOW OFFSET	YES	LAB, 3235	1
1-AFCV2	3236 SOILED	1-ERU-1 EXHAUST	CV	8	[200]	150	[71]	150	[71]	0.4	[100]	AIRFLOW OFFSET	YES	CLEAN STORAGE STERILE, SOILED	1
1-AFCV3	3234 OPERATORY	1-ERU-1 EXHAUST	CV	10	[250]	415	[200]	415	[200]	0.05	[13]	AIRFLOW OFFSET	YES	OPERATORIES 3233, 3234	1
1-AFCV4	3232 OPERATORY	1-ERU-1 EXHAUST	CV	10	[250]	415	[200]	415	[200]	0.05	[13]	AIRFLOW OFFSET	YES	OPERATORIES 3231, 3232	1
1-AFCV5	3230 OPERATORY	1-ERU-1 EXHAUST	CV	10	[250]	415	[200]	415	[200]	0.05	[13]	AIRFLOW OFFSET	YES	OPERATORIES 3229, 3230	1
1-AFCV6	3237 PASSAGE	1-AHU-10 RETURN	CV	8	[200]	435	[210]	435	[210]	0.05	[13]	AIRFLOW OFFSET	YES	XRAY 3228, CNTRL 3228A	1
1-AFCV7	3228 XRAY	1-AHU-10 RETURN	VAV	8	[200]	240	[110]	240	[110]	0.05	[13]	AIRFLOW OFFSET	YES	PASSAGE 3237, 3237A	

1. CONSTANT VOLUME DURING OCCUPIED PERIORDS WITH REDUCED CONSTANT AIRFLOW SETBACKS WHEN UNOCCUPIED AS DETERMINED BY SCHEDULE IN ECC.

AIR FLOW MEASURING DEVICE SCHEDULE

MARK	LOCATION	SYSTEM AND/OR SERVICE	AIR FLOW				DUCT SIZE				APD		REMARKS	COMMENTS
			MIN		MAX		WIDTH		HEIGHT					
			CFM	[L/s]	CFM	[L/s]	IN	[mm]	IN	[mm]	IN	[mm]		
1-AFMD1	3105 WAITING	1-AHU10	1170	[550]	1170	[550]	26	[650]	10	[250]	0.1	[3]	1	ROOM AIRFLOW OFFSET
1-AFMD2	3219 WAITING	1-AHU10	490	[230]	490	[230]	18	[450]	8	[200]	0.1	[3]	1	ROOM AIRFLOW OFFSET

REMARKS:
1. AIR FLOW MEASURING DEVICE TO BE A THERMAL DISPERSION TYPE.

EXISTING AIR HANDLING UNIT SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	TYPE	AIR FLOW	AIR FLOW						SUPPLY FAN MARK	RETURN OR RELIEF FAN MARK	EXHAUST FAN MARK	PRE FILTER MARK	AFTER FILTER MARK	FINAL FILTER MARK	HEAT RECOVERY MARK	PREHEAT COIL MARK	COOLING COIL MARK	HUMIDIFIER MARK	REMARKS
					SUPPLY		MIN OA		RETURN												
					CFM	[L/s]	CFM	[L/s]	CFM	[L/s]											
AHU-10	6222A 6TH PENTHOUSE	3RD EAST	CUSTOM	VAV	60000	[28000]	12500	[5900]	47500	[22000]	1-SF-1A, 1-SF-1B	1-RF-1A, 1-RF-1B	N/A	1-PF5	1-AF11A, B	1-FF5	N/A	1-PHC11A, B, C, D	1-CC10A, B, C, D	1-HU-01	1, 2, 3
AHU-11	6122A 6TH PENTHOUSE	3RD WEST	CUSTOM	VAV	60000	[28000]	12500	[5900]	47500	[22000]	1-SF-1A, 1-SF-1B	1-RF-1A, 1-RF-1B	N/A	1-PF5	1-AF11A, B	1-FF5	N/A	1-PHC11A, B, C, D	1-CC11A, B, C, D	1-HU-02	1, 2, 3

1. SCHEDULED AIRFLOWS ARE MAXIMUM DESIGN, ORIGINAL SELECTION PROVIDED ADDITIONAL CAPACITY FOR ADDING MORE SERVED SPACE SUCH AS 3RD FLOOR REMODELLING.
2. EXISTING UNIT, REBALANCE (SUPPLY, RETURN, AND OUTSIDE AIRFLOW) AND ADJUST AIR HANDLING UNIT TO ADDRESS 3RD FLOOR REMODELLING; AS MIGHT BE NECESSARY, CHANGE SHEAVES.
3. CONTROLS CONTRACTOR TO WORK WITH TEST AND BALANCE AND MECHANICAL CONTRACTORS TO ADJUST CONTROL SETPOINTS TO ADDRESS ADDITIONAL SERVED SPACES.

FAN SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	SYSTEM AND/OR SERVICE	AIR FLOW		TSP		FAN								MOTOR ELECTRICAL						CONTROL SEQUENCE	REMARKS
								TYPE	WHEEL	CLASS	ARRANGEMENT, ROTATION, AND DISCHARGE	DIAMETER		MIN % EFF	DRIVE	FAN MAX RPM	NOMINAL POWER			PHASE	VOLT	RPM	SPEED CONTROL	
				CFM	[L/s]	IN	[Pa]					IN	[mm]				BHP	HP	[kW]					
1-SF-1A	6222A 6TH PENTHOUSE	3RD EAST	1-AHU10 SUPPLY	30000	[14000]	6.5	[1600]	PLENUM					[ ]			1268		50	[37]	3	460		VARIABLE		1
1-SF-1B	6222A 6TH PENTHOUSE	3RD EAST	1-AHU10 SUPPLY	30000	[14000]	6.5	[1600]	PLENUM					[ ]			1268		50	[37]	3	460		VARIABLE		1
1-SF-2A	6122A 6TH PENTHOUSE	3RD WEST	1-AHU11 SUPPLY	30000	[14000]	6.5	[1600]	PLENUM					[ ]			1268		50	[37]	3	460		VARIABLE		1
1-SF-2B	6122A 6TH PENTHOUSE	3RD WEST	1-AHU11 SUPPLY	30000	[14000]	6.5	[1600]	PLENUM					[ ]			1268		50	[37]	3	460		VARIABLE		1
1-RF-1A	6222A 6TH PENTHOUSE	3RD EAST	1-AHU10 RETURN	25000	[12000]	1.15	[290]	PLENUM					[ ]			648		10	[8]	3	460		VARIABLE		1
1-RF-1B	6222A 6TH PENTHOUSE	3RD EAST	1-AHU10 RETURN	25000	[12000]	1.15	[290]	PLENUM					[ ]			648		10	[8]	3	460		VARIABLE		1
1-RF-2A	6122A 6TH PENTHOUSE	3RD EAST	1-AHU11 RETURN	25000	[12000]	1.15	[290]	PLENUM					[ ]			648		10	[8]	3	460		VARIABLE		1
1-RF-2B	6122A 6TH PENTHOUSE	3RD EAST	1-AHU11 RETURN	25000	[12000]	1.15	[290]	PLENUM					[ ]			648		10	[8]	3	460		VARIABLE		1

1. SCHEDULED AIRFLOWS ARE MAXIMUM DESIGN, ORIGINAL SELECTION PROVIDED ADDITIONAL CAPACITY FOR ADDING MORE SERVED SPACE SUCH AS 3RD FLOOR REMODELLING.
2. EXISTING UNIT, REBALANCE (SUPPLY, RETURN, AND OUTSIDE AIRFLOW) AND ADJUST AIR HANDLING UNIT TO ADDRESS REMODELLED 3RD FLOOR SPACES; AS MIGHT BE NECESSARY, CHANGE SHEAVES.
3. CONTROLS CONTRACTOR TO WORK WITH TEST AND BALANCE AND MECHANICAL CONTRACTORS TO ADJUST CONTROL SETPOINTS TO ADDRESS ADDITIONAL SERVED SPACES.

SINGLE DUCT AIR TERMINAL UNIT SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	SYSTEM AND/OR SERVICE	SIZE	APD	AIRFLOW				ADDITIONAL SOUND ATTUNATION REQUIRED	CONTROL TYPE	CONTROL SEQUENCE	PERIMETER SUPPLEMENTAL HEAT LINK	REMARKS
						MAX		MIN						
						CFM	[L/s]	CFM	[L/s]					
1-TU-10-1	3299A-1	RECEPTION (3105A)	1-AHU10	B	0.6	225	[110]	110	[52]	NO	VAV	5 DEGREE DEADBAND	NONE	1
1-TU-10-2	3299A-1	WAITING (3105)	1-AHU10	G	0.6	800	[380]	800	[380]	NO	CV	5 DEGREE DEADBAND	STEAM CONVECTOR	1
1-TU-10-3	3299A-1	CORRIDOR (3299 WEST)	1-AHU10	E	0.6	375	[180]	375	[180]	NO	CV	5 DEGREE DEADBAND	NONE	1
1-TU-10-4	3211	CLERK WORK, MEN, WOMEN (3225, 3211, 3209)	1-AHU10	G	0.6	700	[330]	580	[270]	NO	VAV	5 DEGREE DEADBAND	STEAM CONVECTORS	1
1-TU-10-5	3219	WAITING (3219)	1-AHU10	E	0.6	420	[200]	420	[200]	NO	CV	5 DEGREE DEADBAND	NONE	1
1-TU-10-6	3227	OFFICE (3227)	1-AHU10	C	0.6	250	[120]	150	[71]	NO	VAV	5 DEGREE DEADBAND	STEAM CONVECTOR	1
1-TU-10-7	3229	OPERATORY (3229)	1-AHU10	C	0.6	245	[120]	245	[120]	NO	CV	5 DEGREE DEADBAND	STEAM CONVECTOR	1,2
1-TU-10-8	3231	OPERATORY (3231)	1-AHU10	C	0.6	245	[120]	245	[120]	NO	CV	5 DEGREE DEADBAND	STEAM CONVECTOR	1,2
1-TU-10-9	3233	OPERATORY (3233)	1-AHU10	C	0.6	245	[120]	245	[120]	NO	CV	5 DEGREE DEADBAND	STEAM CONVECTOR	1,2
1-TU-10-10	3235	LAB (3235)	1-AHU10	G	0.6	750	[350]	750	[350]	NO	CV	5 DEGREE DEADBAND	NONE	1,2
1-TU-10-11	3237	CLEAN STRG STERILE (3237)	1-AHU10	C	0.6	135	[64]	135	[64]	NO	CV	5 DEGREE DEADBAND	STEAM CONVECTORS	1,2
1-TU-10-12	3234	OPERATORY (3234)	1-AHU10	C	0.6	250	[120]	210	[99]	NO	CV	5 DEGREE DEADBAND	STEAM CONVECTOR	1,2
1-TU-10-13	3232	OPERATORY (3232)	1-AHU10	C	0.6	250	[120]	210	[99]	NO	CV	5 DEGREE DEADBAND	STEAM CONVECTOR	1,2
1-TU-10-14	3230	OPERATORY (3230)	1-AHU10	C	0.6	250	[120]	210	[99]	NO	CV	5 DEGREE DEADBAND	STEAM CONVECTOR	1,2
1-TU-10-15	3230	X-RAY (3228)	1-AHU10	C	0.6	220	[100]	90	[42]	NO	VAV	5 DEGREE DEADBAND	STEAM CONVECTOR	1
1-TU-10-16	3228A	X-RAY CONTROL ROOM (3228A)	1-AHU10	A	0.6	75	[35]	35	[17]	NO	VAV	5 DEGREE DEADBAND	NONE	1
1-TU-10-17	3299B-1	CORRIDOR (3299 B1)	1-AHU10	E	0.6	415	[200]	415	[200]	NO	CV	5 DEGREE DEADBAND	NONE	1
1-TU-10-18	3237	PASSAGE, PASSAGE (3237, 3237A)	1-AHU10	C	0.6	270	[130]	270	[130]	NO	CV	5 DEGREE DEADBAND	NONE	1,2
1-TU-11-1	3199A-1	CLERK / RESCHEDULE, CORRIDOR (3109, 3199A-1)	1-AHU11	C	0.6	205	[97]	205	[97]	NO	VAV	5 DEGREE DEADBAND	STEAM CONVECTOR	1
1-TU-11-2	3113	GROUP (3113)	1-AHU11	E	0.6	380	[180]	175	[83]	NO	VAV	5 DEGREE DEADBAND	NONE	1
1-TU-11-3	3117	GROUP, CORRIDOR (3117, 3199a-1)	1-AHU11	E	0.6	360	[170]	185	[87]	NO	VAV	5 DEGREE DEADBAND	NONE	1
1-TU-11-4	3119	TELE-HEALTH, TELE-HEALTH (3119, 3123)	1-AHU11	C	0.6	200	[94]	125	[59]	NO	VAV	5 DEGREE DEADBAND	NONE	1
1-TU-11-5	3199A-1	CORRIDORS (3199A-1, 3199A-2)	1-AHU11	C	0.6	305	[140]	305	[140]	NO	CV	5 DEGREE DEADBAND	NONE	1

REMARKS
1. CONTROLS AND CONTROL DAMPER ACTUATOR BY CONTROLS CONTRACTOR.
2. ADJUSTABLE UNOCCUPIED RESET TO REDUCED CONSTANT VOLUME AIRFLOW.

AIR TERMINAL UNIT SIZING SCHEDULE

SIZE	MIN ALLOWABLE AIRFLOW		MAX ALLOWABLE AIRFLOW		DUCT INLET SIZE		MAX APD		MAXIMUM SOUND POWER LEVEL (Re: 10^{-12} WATTS) FOR BOX DISCHARGE AT MAXIMUM INLET DUCT STATIC						REMARKS
									OCTAVE BANDS						
	CFM	[L/s]	CFM	[L/s]	IN	[mm]	IN WG	[Pa]	2	3	4	5	6	7	
A	60	[28]	170	[80]	4	[100]	0.4	[100]	69	65	58	52	51	47	----
B	90	[42]	260	[120]	5	[130]	0.4	[100]	69	63	59	52	51	47	----
C	130	[61]	380	[180]	6	[150]	0.4	[100]	69	67	61	55	52	49	----
D	160	[76]	490	[230]	7	[180]	0.4	[100]	70	68	63	57	53	49	----
E	230	[110]	680	[320]	8	[200]	0.4	[100]	71	68	59	53	51	47	----
F	270	[130]	790	[370]	9	[230]	0.4	[100]	71	69	60	54	51	47	----
G	350	[170]	1050	[500]	10	[250]	0.4	[100]	74	68	61	57	54	52	----
H	500	[240]	1500	[710]	12	[300]	0.4	[100]	73	69	64	59	57	53	----
I	750	[350]	2250	[1100]	14	[350]	0.4	[100]	73	68	65	61	61	59	----
J	1000	[470]	3000	[1400]	16	[400]	0.4	[100]	73	68	66	60	58	55	----

NOTE: INLET STATIC BASED ON ARI 885-98

ROTARY AIR TO AIR HEAT RECOVERY WHEEL SCHEDULE

MARK	LOCATION	SYSTEM AND/OR SERVICE	MODE	SUPPLY AIR								EXHAUST AIR								ROTOR MOTOR				REMARKS
				SUPPLY AIR FLOW		APD		EAT				LAT				AIR FLOW		APD		EAT				LAT				
								Db		Wb		Db		Wb						Db		Wb		Db		Wb		
				CFM	[L/s]	IN	[Pa]	°F	[°C]	°F	[°C]	°F	[°C]	°F	[°C]	CFM	[L/s]	IN	[mm]	°F	[°C]	°F	[°C]	°F	[°C]	°F	[°C]	HP	[kW]	PHASE	VOLT	
1-ERU-1	6TH ROOF EAST	1-AHU-10	SUMMER	14000	[6600]		[ ]	92	[33]	76.6	[25]	75	[24]	62.6	[17]	14786	[7000]		[ ]	78	[26]							[ ]	3	208	EXISTING UNIT
			WINTER	14000	[6600]		[ ]	-20	[-29]			47.4	[9]			14786	[7000]		[ ]	68	[20]										
1-ERU-2	6TH ROOF WEST	1-AHU-11	SUMMER	14000	[6600]		[ ]	92	[33]	76.6	[25]	75	[24]	62.6	[17]	14786	[7000]		[ ]	78	[26]							[ ]	3	208	EXISTING UNIT
			WINTER	14000	[6600]		[ ]	-20	[-29]			47.4	[9]			14786	[7000]		[ ]	68	[20]										

1. UNIT MOUNTED ENERGY RECOVERY WHEEL CONTROLLER WITH FROST CONTROL, ROTATION FAILURE OUTPUT FOR ECC, COMMUNICATION PROTOCOL FOR SIEMENS P1 NETWORK.
2. UNIT MOUNTED ENERGY RECOVERY WHEEL VFD WITH COMMUNICATION CARD FOR SIEMENS P1 NETWORK.

BID DOCUMENTS	04/06/2012
Revisions:	Date

CONSULTANTS:

ARCHITECT/ENGINEERS:

adg

11-005

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MEP PROJECT NO.: U08.09.04

Drawing Title: MECHANICAL SCHEDULES

Approved: Project Director

Project Title: OSCAR G. JOHNSON VA MEDICAL CENTER EXPAND MENTAL HEALTH - 3C

Location: IRON MOUNTAIN, MICHIGAN

Date: APRIL 6, 2012 | Checked: GJ | Drawn: JRM

Project Number: 585-09-103

Building Number: No. 1

Drawing Number: M.601

Dwg. 35 of 45

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231, OCT 1978

STEAM HUMIDIFER SCHEDULE

MARK	LOCATION	SYSTEM AND/OR SEVICE	HUMIDIFIER TYPE	AIR FLOW		# OF MANIFOLDS	EAT				LAT		SOURCE	STEAM						CONTROL TYPE	TRAP			REMARKS
							Db		Wb		DEWPOINT	DEWPOINT		PRESS ENT VALVE		PRESS ENT HEATER		FLOW			MARK	CAPACITY		
				CFM	[L/s]		°F	[°C]	°F	[°C]	°F	°F	[°C]		PSIG	[kPa]	PSIG	[kPa]	LBS/HR	[kg/HR]			LBS/HR	[kg/HR]	
1-HU-01	6222A 6TH PENTHOUSE	1-AHU10	UNIT-MOUNTED DISPERSION TUBE	60000	[28000]		55	[13]	45.1	[7]	34.1	[1]	48.6	[9]	BOILER STEAM		[ ]	5	[35]	544	[250]				[ ]	1, 132 INCH, 18" VAPOR TRAIL
1-HU-02	6122A 6TH PENTHOUSE	1-AHU11	UNIT-MOUNTED DISPERSION TUBE	60000	[28000]		55	[13]	45.1	[7]	34.1	[1]	48.6	[9]	BOILER STEAM		[ ]	5	[35]	544	[250]				[ ]	1, 132 INCH, 18" VAPOR TRAIL
1-HU-03	3238 SOILED	1-AHU-10	DUCT-MOUNTED DISPERSION TUBE	135	[64]	1	55	[13]	44	[7]	31.2	[-]	39.3	[4]	BOILER STEAM	5	[35]		[ ]	0.9	[ ]			3	[1]	3, 4, 8 - 12
1-HU-04	3228 X-RAY	1-AHU-10	DUCT-MOUNTED DISPERSION TUBE	220	[100]	1	55	[13]	44	[7]	31.2	[-]	43.6	[6]	BOILER STEAM	5	[35]		[ ]	2.6	[1]			9	[4]	3, 4, 8 - 12
1-HU-05	3237 PASSAGE	1-AHU-10	DUCT-MOUNTED DISPERSION TUBE	270	[130]	1	55	[13]	44	[7]	31.2	[-]	50.5	[10]	BOILER STEAM	5	[35]		[ ]	5.1	[2]			15	[7]	3, 4, 8 - 12
1-HU-06	3299B-1	1-AHU-10	DUCT-MOUNTED DISPERSION TUBE	415	[200]	1	55	[13]	44	[7]	31.2	[-]	50.5	[10]	BOILER STEAM	5	[35]		[ ]	7.8	[4]			24	[11]	2 - 6, 11, 12
1-HU-07	3299A-1	1-AHU-10	DUCT-MOUNTED DISPERSION TUBE	375	[180]	1	55	[13]	44	[7]	31.2	[-]	50.5	[10]	BOILER STEAM	5	[35]		[ ]	7	[3]			21	[10]	3, 4, 8 - 12
1-HU-08	3199A-1	1-AHU-11	DUCT-MOUNTED DISPERSION TUBE	305	[140]	1	55	[13]	44	[7]	31.2	[-]	50.5	[10]	BOILER STEAM	5	[35]		[ ]	5.7	[3]			18	[8]	3, 4, 8 - 12

NOTES:
1. EXISTING UNIT, INFORMATION FOR REFERENCE ONLY.
2. EXISTING UNIT, CONTRACTOR TO RELOCATE.
3. INSTALL HUMIDIFER PER MANUFACTURERS RECOMMENDATIONS
4. PIPING SHALL BE FULL SIZE TO COIL WITH REDUCERS AT CONTROL VALVE.
5. REINSTALL EXISTING ACCESSORY - HIGH LIMIT HUMIDSTAT
6. REINSTALL EXISTING ACCESSORY - DUCT PRESSURE SWITCH.
7. REINSTALL EXISTING CONTROLS - CONTROL VALVES, ROOM HUMIDISTAT, UNIT CONTROLLER, ETC.
8. MECHANICAL CONTRACTOR TO PROVIDE NEW HUMIDIFIER.
9. PROVIDE HUMIDIFIER CONTROLS, INTEGRATED TO ECC, HIGH LIMIT, HUMIDISTAT, UNIT CONTROLLER, ETC,
10. PROVIDE NEW DUCT PRESSURE SWITCH
11. BASIS OF DESIGN ARMSTRONG HEM 90.
12. SIZING BASED ON AHU HUMIDIFIER NOT OPERATING.

HOT WATER HEATING COIL SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	SYSTEM AND/OR SERVICE	APPLICATION	AIRFLOW		TEMPERATURES				TOTAL MIN CAPACITY		HOT WATER								REMARKS
							EAT		LAT				FLOW		EWT		LWT		WPD		
					CFM	[L/s]	°F	[°C]	°F	[°C]	MBH	[kW]	GPM	[L/s]	°F	[°C]	°F	[°C]	FT	[kPa]	
1-TU-10-1	3299A-1	RECEPTION (3105A)	1-AHU10	REHEAT	110	[52]	55	[13]	106.5	[41]	6.14	[2]	.65	[ ]	140	[60]	121	[50]	0.29	[1]	4
1-TU-10-2	3299A-1	WAITING (3105)	1-AHU10	REHEAT	800	[380]	55	[13]	87.6	[31]	28.3	[8]	2.8	[ ]	140	[60]	120	[49]	1.30	[4]	4
1-TU-10-3	3299A-1	CORRIDOR (3299 WEST)	1-AHU10	REHEAT	375	[180]	55	[13]	87.4	[31]	13.2	[4]	1.3	[ ]	140	[60]	120	[49]	1.03	[3]	4
1-TU-10-4	3211	CLERK WORK, MEN, WOMEN (3225, 3211, 3209)	1-AHU10	REHEAT	580	[270]	55	[13]	93.0	[34]	23.9	[7]	2.5	[ ]	140	[60]	121	[49]	1.01	[3]	4
1-TU-10-5	3219	WAITING (3219)	1-AHU10	REHEAT	420	[200]	55	[13]	85.0	[29]	13.7	[4]	1.4	[ ]	140	[60]	120	[49]	0.17	[1]	4
1-TU-10-6	3227	OFFICE (3227)	1-AHU10	REHEAT	100	[47]	55	[13]	106.8	[42]	5.6	[2]	0.6	[ ]	140	[60]	120	[49]	0.56	[2]	4
1-TU-10-7	3229	OPERATORY (3229)	1-AHU10	REHEAT	245	[120]	55	[13]	94.0	[34]	10.4	[3]	1.0	[ ]	140	[60]	120	[49]	0.67	[2]	4
1-TU-10-8	3231	OPERATORY (3231)	1-AHU10	REHEAT	245	[120]	55	[13]	94.0	[34]	10.4	[3]	1.0	[ ]	140	[60]	120	[49]	0.67	[2]	4
1-TU-10-9	3233	OPERATORY (3233)	1-AHU10	REHEAT	245	[120]	55	[13]	94.0	[34]	10.4	[3]	1.0	[ ]	140	[60]	120	[49]	0.67	[2]	4
1-TU-10-10	3235	LAB (3235)	1-AHU10	REHEAT	750	[350]	55	[13]	88.6	[31]	27.33	[8]	2.74	[ ]	140	[60]	120	[49]	1.22	[4]	4
1-TU-10-11	3237	CLEAN STRG STERILE (3237)	1-AHU10	REHEAT	135	[64]	55	[13]	102.9	[39]	7.0	[2]	0.7	[ ]	140	[60]	120	[49]	0.34	[1]	4
1-TU-10-12	3234	OPERATORY (3234)	1-AHU10	REHEAT	250	[120]	55	[13]	93.7	[34]	10.5	[3]	1.1	[ ]	140	[60]	120	[49]	0.69	[2]	4
1-TU-10-13	3232	OPERATORY (3232)	1-AHU10	REHEAT	250	[120]	55	[13]	93.7	[34]	10.5	[3]	1.1	[ ]	140	[60]	120	[49]	0.69	[2]	4
1-TU-10-14	3230	OPERATORY (3230)	1-AHU10	REHEAT	250	[120]	55	[13]	93.7	[34]	10.5	[3]	1.1	[ ]	140	[60]	120	[49]	0.69	[2]	4
1-TU-10-15	3230	X-RAY (3228)	1-AHU10	REHEAT	100	[47]	55	[13]	106.8	[42]	5.6	[2]	0.6	[ ]	140	[60]	120	[49]	0.23	[1]	4
1-TU-10-16	3228A	X-RAY CONTROL ROOM (3228A)	1-AHU10	REHEAT	100	[47]	55	[13]	106.8	[42]	5.6	[2]	0.6	[ ]	140	[60]	120	[49]	0.23	[1]	4
1-TU-10-17	3299B-1	CORRIDOR (3299 B1)	1-AHU10	REHEAT	415	[200]	55	[13]	85.1	[30]	13.5	[4]	1.4	[ ]	140	[60]	120	[49]	0.16	[1]	4
1-TU-10-20	3237	PASSAGE, PASSAGE (3237, 3237A)	1-AHU10	REHEAT	270	[130]	55	[13]	90.2	[32]	10.3	[3]	1.0	[ ]	140	[60]	120	[49]	0.10	[ ]	4
1-TU-11-1	3199A-1	CLERK / RESCHEDULE, CORRIDOR (3109, 3199A-1)	1-AHU11	REHEAT	110	[52]	55	[13]	105.6	[41]	6.0	[2]	0.6	[ ]	140	[60]	120	[49]	0.26	[1]	4
1-TU-11-2	3113	GROUP (3113)	1-AHU11	REHEAT	175	[83]	55	[13]	99.1	[37]	8.4	[3]	0.8	[ ]	140	[60]	120	[49]	0.46	[1]	4
1-TU-11-3	3117	GROUP (3117)	1-AHU11	REHEAT	185	[87]	55	[13]	98.3	[37]	8.7	[3]	0.9	[ ]	140	[60]	120	[49]	0.49	[2]	4
1-TU-11-4	3119	TELE-HEALTH, TELE-HEALTH (3119, 3123)	1-AHU11	REHEAT	120	[57]	55	[13]	104.4	[40]	6.4	[2]	0.6	[ ]	140	[60]	120	[49]	0.29	[1]	4
1-TU-11-5	3199A-1	CORRIDORS (3199A-1, 3199A-2)	1-AHU11	REHEAT	305	[140]	55	[13]	90.6	[33]	11.8	[4]	1.2	[ ]	140	[60]	120	[49]	0.84	[3]	4
1-HC-10A	6222A 6TH PENTHOUSE	3RD EAST	1-AHU10	PREHEAT	7500	[3500]	-3.8	[-20]	55	[13]	476.3	[140]	15.9	[1]	180	[82]	120	[49]	0.20	[1]	2, 3, 1 ROW, 25 SQ FT
1-HC-10B	6222A 6TH PENTHOUSE	3RD EAST	1-AHU10	PREHEAT	7500	[3500]	-3.8	[-20]	55	[13]	476.3	[140]	15.9	[1]	180	[82]	120	[49]	0.20	[1]	2, 3, 1 ROW, 25 SQ FT
1-HC-10C	6222A 6TH PENTHOUSE	3RD EAST	1-AHU10	PREHEAT	7500	[3500]	-3.8	[-20]	55	[13]	476.3	[140]	15.9	[1]	180	[82]	120	[49]	0.20	[1]	2, 3, 1 ROW, 25 SQ FT
1-HC-10D	6222A 6TH PENTHOUSE	3RD EAST	1-AHU10	PREHEAT	7500	[3500]	-3.8	[-20]	55	[13]	476.3	[140]	15.9	[1]	180	[82]	120	[49]	0.20	[1]	2, 3, 1 ROW, 25 SQ FT
1-HC-11A	6122A 6TH PENTHOUSE	3RD WEST	1-AHU11	PREHEAT	7500	[3500]	-3.8	[-20]	55	[13]	476.3	[140]	15.9	[1]	180	[82]	120	[49]	0.20	[1]	2, 3, 1 ROW, 25 SQ FT
1-HC-11B	6122A 6TH PENTHOUSE	3RD WEST	1-AHU11	PREHEAT	7500	[3500]	-3.8	[-20]	55	[13]	476.3	[140]	15.9	[1]	180	[82]	120	[49]	0.20	[1]	2, 3, 1 ROW, 25 SQ FT
1-HC-11C	6122A 6TH PENTHOUSE	3RD WEST	1-AHU11	PREHEAT	7500	[3500]	-3.8	[-20]	55	[13]	476.3	[140]	15.9	[1]	180	[82]	120	[49]	0.20	[1]	2, 3, 1 ROW, 25 SQ FT
1-HC-11D	6122A 6TH PENTHOUSE	3RD WEST	1-AHU11	PREHEAT	7500	[3500]	-3.8	[-20]	55	[13]	476.3	[140]	15.9	[1]	180	[82]	120	[49]	0.20	[1]	2, 3, 1 ROW, 25 SQ FT

NOTES:
1. EXISTING VAV TO REMAIN.
2. SCHEDULED PERFORMANCE IS MAXIMUM DESIGN, ORIGINAL SELECTION PROVIDED ADDITIONAL CAPACITY FOR ADDING MORE SERVED SPACE SUCH AS 3RD FLOOR REMODELLED AREA.
3. EXISTING UNIT, REBALANCE HOT WATER FLOW TO ADDRESS ADDITIONAL 3RD FLOOR SERVED SPACES.
4. HOT WATER CONTROL VALVE AND ACTUATOR BY CONTROLS CONTRACTOR.

CHILLED WATER COOLING COIL SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	SYSTEM AND/OR SERVICE	AIR FLOW		MAX FACE VELOCITY		APD		EAT				LAT				TOTAL CAPACITY		SENSIBLE CAPACITY		CHILLED WATER								REMARKS
										Db		Wb		Db		Wb						FLOW		EWT		LWT		WPD		
				CFM	[L/s]	FPM	[M/s]	IN WG	[Pa]	°F	[°C]	°F	[°C]	°F	[°C]	°F	[°C]	MBH	[kW]	MBH	[kW]	GPM	[L/s]	°F	[°C]	°F	[°C]	FT	[M]	
1-CC-10A	6222A 6TH PENTHOUSE	3RD EAST	1-AHU10	15000	[7100]	461.5	[2]	1.1	[280]	80	[27]	67	[19]	52	[11]	50.6	[10]	426/734	120/220	454	[130]	85	[5]	44	[7]	54	[12]	9.9	[3]	1, 2, 3
1-CC-10B	6222A 6TH PENTHOUSE	3RD EAST	1-AHU10	15000	[7100]	461.5	[2]	1.1	[280]	80	[27]	67	[19]	52	[11]	50.6	[10]	426/734	120/220	454	[130]	85	[5]	44	[7]	54	[12]	9.9	[3]	1, 2, 3
1-CC-10C	6222A 6TH PENTHOUSE	3RD EAST	1-AHU10	15000	[7100]	461.5	[2]	1.1	[280]	80	[27]	67	[19]	52	[11]	50.6	[10]	426/734	120/220	454	[130]	85	[5]	44	[7]	54	[12]	9.9	[3]	1, 2, 3
1-CC-10D	6222A 6TH PENTHOUSE	3RD EAST	1-AHU10	15000	[7100]	461.5	[2]	1.1	[280]	80	[27]	67	[19]	52	[11]	50.6	[10]	426/734	120/220	454	[130]	85	[5]	44	[7]	54	[12]	9.9	[3]	1, 2, 3
1-CC-111A	6122A 6TH PENTHOUSE	3RD WEST	1-AHU11	15000	[7100]	461.5	[2]	1.1	[280]	80	[27]	67	[19]	52	[11]	50.6	[10]	426/734	120/220	454	[130]	85	[5]	44	[7]	54	[12]	9.9	[3]	1, 2, 3
1-CC-11B	6122A 6TH PENTHOUSE	3RD WEST	1-AHU11	15000	[7100]	461.5	[2]	1.1	[280]	80	[27]	67	[19]	52	[11]	50.6	[10]	426/734	120/220	454	[130]	85	[5]	44	[7]	54	[12]	9.9	[3]	1, 2, 3
1-CC-11C	6122A 6TH PENTHOUSE	3RD WEST	1-AHU11	15000	[7100]	461.5	[2]	1.1	[280]	80	[27]	67	[19]	52	[11]	50.6	[10]	426/734	120/220	454	[130]	85	[5]	44	[7]	54	[12]	9.9	[3]	1, 2, 3
1-CC-11D	6122A 6TH PENTHOUSE	3RD WEST	1-AHU11	15000	[7100]	461.5	[2]	1.1	[280]	80	[27]	67	[19]	52	[11]	50.6	[10]	426/734	120/220	454	[130]	85	[5]	44	[7]	54	[12]	9.9	[3]	1, 2, 3

NOTE
1. SCHEDULED PERFORMANCE IS MAXIMUM DESIGN, ORIGINAL SELECTION PROVIDED ADDITIONAL CAPACITY FOR ADDING MORE SERVED SPACE SUCH AS 3RD FLOOR REMODELLED AREA.
2. EXISTING UNIT, REBALANCE CHILLED WATER FLOW TO ADDRESS ADDITIONAL 3RD FLOOR SERVED SPACES.
3. COIL CORRECTIONS HAVE BEEN APPLIED FOR GPM, WPD, APD, EWT, LWT FOR A 30% PROPYLENE GLYCOL / WATER SOLUTION.

PUMP SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	SYSTEM AND/OR SERVICE	TYPE	CIRCULATING FLUID									MIN % EFF	ELECTRICAL MOTOR						REMARKS
					FLUID	FLOW		HEAD		NPSH AVAILABLE		TEMPERATURE		SP GR		NOMINAL POWER		PHASE	VOLT	MAX RPM	SPEED CONTROL	
						GPM	[L/s]	FT	[kPa]	FT	[kPa]	°F	[°C]			HP	[kW]					
1-P-6	6222A 6TH PENTHOUSE	EAST SIDE	AHU10 REHEATS ECT	IN LINE	HEATING WATER	240	[15]	80	[1300]			180	[82]			10		3		1750	VFD	1, 2, 3
1-P-7	6122A 6TH PENTHOUSE	WEST SIDE	AHU11 REHEATS ECT	IN LINE	HEATING WATER	240	[15]	80	[1300]			180	[82]			10		3		1750	VFD	1, 2, 3
1-P-8	6222A 6TH PENTHOUSE	EAST SIDE	AHU10 REHEATS ECT	IN LINE	HEATING WATER	240	[15]	80	[1300]			180	[82]			10		3		1750	VFD	1, 2, 3
1-P-9	6122A 6TH PENTHOUSE	WEST SIDE	AHU11 REHEATS ECT	IN LINE	HEATING WATER	240	[15]	80	[1300]			180	[82]			10		3		1750	VFD	1, 2, 3

REMARKS:
1. SCHEDULED FLOWS ARE MAXIMUM DESIGN, ORIGINAL SELECTION PROVIDED ADDITIONAL CAPACITY FOR ADDING MORE SERVED SPACE SUCH AS REMODELLED 3RD FLOOR SPACES.
2. EXISTING UNIT, REBALANCE AND ADJUST PUMP TO ADDRESS REMODELLED 3RD FLOOR SERVED SPACES, AS MIGHT BE NECESSARY.
3. CONTROLS CONTRACTOR TO WORK WITH TEST AND BALANCE AND MECHANICAL CONTRACTORS TO ADJUST CONTROL SETPOINTS TO ADDRESS ADDITIONAL SERVED SPACES.

RADIANT CEILING PANEL SCHEDULE (HYDRONIC)

MARK	LOCATION	AREA SERVED	PANEL SIZE		HEATING								REMARKS
					HEATING CAPACITY		EWT		LWT		HOT WATER FLOWRATE		WPD		
			IN	[mm]	BTUH	[W]	°F	[°C]	°F	[°C]	GPM	[L/M]	FT	[kPa]	
1-HRP-1	3209	TOILET	48 X 24	[1200 X 600]	6,000	[1800]	180	[82]	150	[66]	.5	[2]	1.0	[3]	----
1-HRP-2	3211	TOILET	48 X 24	[1200 X 600]	6,000	[1800]	180	[82]	150	[66]	.5	[2]	1.0	[3]	----

BID DOCUMENTS	04/06/2012
Revisions:	Date

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MEP PROJECT NO.: U08.09.04

Drawing Title: MECHANICAL SCHEDULES

Approved: Project Director

Project Title: OSCAR G. JOHNSON VA MEDICAL CENTER EXPAND MENTAL HEALTH - 3C

Location: IRON MOUNTAIN, MICHIGAN

Date: APRIL 6, 2012 | Checked: GJ | Drawn: JRM

Project Number: 585-09-103

Building Number: No. 1

Drawing Number: M.602

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Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231, OCT 1978

ROOM AIR BALANCE SCHEDULE

ROOM NO.	ROOM NAME	AIR HANDLING UNIT NO.	TERMINAL UNIT	SUPPLY				RETURN AND/OR EXHAUST						REMARKS
				ROOM AIRFLOW		# AIR DEVICES	AIR DEVICE MARK	RETURN EXHAUST TRANSFER (R/E/T)	ROOM AIRFLOW		# AIR DEVICES	AIR DEVICE MARK	TRANSFER AIRFLOW		
				CFM	L/S				CFM	L/S			CFM	L/S	
3105	WAITING	1-AHU10	1-TU-10-02	800	[380]	2	SD-3	E/T	1170	[550]	4	EG-3	-370	[-200]	EXHAUST ALSO FROM RECEPTION 3105A, TRANSFER FOR EXHAUST FROM CORRIDOR 3199
3105A	RECEPTION	1-AHU10	1-TU-10-01	225	[110]	1	SD-2	R	225	[110]	1	RG-2	0	[ ]	----
3109	CLERK/RESCHEDULE	1-AHU11	1-TU-11-01	205	[97]	1	SD-1	R	205	[97]	1	RG-1	0	[ ]	----
3113	GROUP	1-AHU11	1-TU-11-02	380	[180]	1	SD-3	R	380	[180]	1	RG-3	0	[ ]	----
3117	GROUP	1-AHU11	1-TU-11-03	360	[170]	1	SD-2	R	360	[170]	1	RG-2	0	[ ]	----
3119	TELE-HEALTH	1-AHU11	1-TU-11-04	100	[47]	1	SD-1	R	100	[47]	1	RG-1	0	[ ]	----
3123	TELE-HEALTH	1-AHU11	1-TU-11-04	100	[47]	1	SD-1	R	100	[47]	1	RG-1	0	[ ]	----
3199A-1	CORRIDOR	1-AHU11	1-TU-11-05	150	[71]	1	SD-1	R	150	[71]	1	RG-1	0	[ ]	----
3199A-2	CORRIDOR	1-AHU11	1-TU-11-05	155	[73]	1	SD-1	R	155	[73]	1	RG-1	0	[ ]	----
3209	WOMEN	1-AHU10	1-TU-10-04	155	[83]	1	SD-1	E/T	225	[ ]	1	EG-3	-70	[ ]	EXHAUST AIR TRANSFERRED FROM CORRIDOR VIA DOOR GRILLE
3211	MEN	1-AHU10	1-TU-10-04	155	[83]	1	SD-1	E/T	225	[ ]	1	EG-3	-70	[ ]	EXHAUST AIR TRANSFERRED FROM CORRIDOR VIA DOOR GRILLE
3219	WAITING	1-AHU10	1-TU-10-05	420	[200]	1	SD-3	E/T	490	[230]	1	EG-4	-70	[-30]	EXHAUST AIR TRANSFERRED FROM CORRIDOR VIA DOOR GRILLE
3225	CLERK WORK	1-AHU10	1-TU-10-04	390	[180]	3	SD-1	R/T	315	[150]	1	RG-3	75	[35]	----
3225A	TOILET	1-AHU10		0	[ ]	-	-	E/T	75	[35]	1	EG-1	-75	[-40]	TRANSFERRED TO TOILET 3225A VIA DOOR UNDERCUT
3227	OFFICE	1-AHU10	1-TU-10-06	255	[120]	1	SD-2	R	255	[120]	1	RG-2	0	[ ]	----
3228	X-RAY	1-AHU10	1-TU-10-15	215	[100]	1	SD-2	R	240	[110]	1	RG-2	-25	[-10]	SUPPLY AIR TRANSFERRED FROM XRAY TO CORRIDOR VIA DOOR GRILLE
3228A	CONTROL	1-AHU10	1-TU-10-16	75	[35]	1	SD-1	T	75	[35]	-	-	75	[35]	SUPPLY AIR TRANSFERRED FROM CONTORL TO XRAY
3229	OPERATORY	1-AHU10	1-TU-10-07	245	[120]	1	SD-2	E/T	205	[97]	1	EG-3	40	[19]	TRANSFER TO PASSAGE 3237
3230	OPERATORY	1-AHU10	1-TU-10-14	250	[120]	1	SD-2	E/T	210	[99]	1	EG-3	40	[19]	TRANSFER TO PASSAGE 3237
3231	OPERATORY	1-AHU10	1-TU-10-08	245	[120]	1	SD-2	E/T	205	[97]	1	EG-3	40	[19]	TRANSFER TO PASSAGE 3237
3232	OPERATORY	1-AHU10	1-TU-10-13	250	[120]	1	SD-2	E/T	210	[99]	1	EG-3	40	[19]	TRANSFER TO PASSAGE 3237
3233	OPERATORY	1-AHU10	1-TU-10-09	245	[120]	1	SD-2	E/T	205	[97]	1	EG-3	40	[19]	TRANSFER TO PASSAGE 3237
3234	OPERATORY	1-AHU10	1-TU-10-12	250	[120]	1	SD-2	E/T	210	[99]	1	EG-3	40	[19]	TRANSFER TO PASSAGE 3237
3235	LAB	1-AHU10	1-TU-10-10	750	[350]	2	SD-2	E/T	860	[410]	1	EG-5	-110	[-50]	EXHAUST AIR TRANSFERRED FROM PASSAGE VIA DOOR GRILLE
3236	SOILED	1-AHU10		0	[ ]	1	SD-1	E/T	150	[71]	1	EG-2	-150	[-70]	TRANSFER AIR FROM CORRIDOR UNDER DOOR
3237	PASSAGE	1-AHU10	1-TU-10-18	270	[130]	1	SD-2	R/T	400	[190]	1	RG-3	-130	[-60]	RETURNS AIR FROM POSITIVELY PRESSURIZED OPERATORIES
3238	CLEAN STORAGE STERILE	1-AHU10	1-TU-10-11	135	[64]	1	SD-1	T	0	[ ]	1	RG-2	110	[52]	TRANSFER TO SOILED 3236 THRU TRANSFER DUCT AND TO PASSAGE VIA DOOR GRILLE
3243	STORAGE	1-AHU10		0	[ ]	1	EXIST	E/T	50	[24]	1		-50	[-20]	TRANSFER FROM CORRIDOR
3245	CANTEEN STORAGE	1-AHU10	1-TU-V3245	190	[90]	1	EXIST	E	320	[150]	1	EG-2	-130	[-60]	TRANSFER FROM CORRIDOR
3246	WORK AREA	1-AHU10	1-TU-V3246, 1-TU-3248	780	[370]	6	EXIST	R	780	[370]	1	EXIST	0	[ ]	----
3299A-1	CORRIDOR	1-AHU10	1-TU-10-07	375	[180]	1	SD-2	-	0	[ ]	-	-	375	[180]	SUPPLY AIR TRANSFERRED TO RECEPTION, TOILET & STORAGE ROOMS VIA DUCT, DOOR GRILLE, OR DOOR UNDERCUT
3299B-1	CORRIDOR	1-AHU10	1-TU-10-17	415	[200]	1	SD-2	-	0	[ ]	-	-	415	[200]	SUPPLY AIR TRANSFERRED TO RECEPTION, TOILET & STORAGE ROOMS VIA DUCT, DOOR GRILLE, OR DOOR UNDERCUT
				8540					8550						

NOTE:

AIR FLOW VALUES BASED ON A MINIMUM 23% OUTSIDE AIR.

AIR DEVICE SCHEDULE (SUPPLY)

MARK	TYPE	AIRFLOW MIN CFM	AIRFLOW MIN L/S	AIRFLOW MAX CFM	AIRFLOW MAX L/S	MAX APD WG	MAX APD Pa	MOUNTING	PANEL/FRAME SIZE IN x IN	PANEL/FRAME SIZE [mm x mm]	NECK SIZE IN	NECK SIZE [mm]	MAX NC	DAMPER	FINISH	REMARKS
SD-1	SQUARE PLAQUE FACE	100	[47]	210	[99]	0.100	23.7	TEE GRID CEILING	24 x 24	[600 x 600]	8 ø	[203 ø]	15	NONE	WHITE	-----
SD-2	SQUARE PLAQUE FACE	210	[99]	380	[180]	0.090	21.5	TEE GRID CEILING	24 x 24	[600 x 600]	10 ø	[254 ø]	18	NONE	WHITE	-----
SD-3	SQUARE PLAQUE FACE	380	[180]	600	[280]	0.080	18.9	TEE GRID CEILING	24 x 24	[600 x 600]	12 ø	[305 ø]	22	NONE	WHITE	-----

NOTES

1. SEE FLOOR PLAN FOR THROW PATTERN
2. SEE DETAIL FOR DAMPER IN BRANCH DUCT SERVING EACH DIFFUSER
3. PROVIDE SQUARE TO ROUND ADAPTER AS NEEDED.

AIR DEVICE SCHEDULE (RETURN/EXHAUST)

MARK	TYPE	AIRFLOW MIN CFM	AIRFLOW MIN L/S	AIRFLOW MAX CFM	AIRFLOW MAX L/S	MAX APD W.G.	MAX APD Pa	MOUNTING	PANEL/FRAME SIZE IN x IN	PANEL/FRAME SIZE [mm x mm]	NECK SIZE IN x IN	NECK SIZE [mm x mm]	MAX NC	DAMPER	FINISH	REMARKS
RG-1	PERFORATED	100	[47]	210	[99]	0.088	22.000	TEE GRID CEILING	24 x 24	[600 x 600]	8 x 8	[200 x 200]	15	NONE	WHITE	-----
RG-2	PERFORATED	210	[99]	375	[180]	0.103	26.000	TEE GRID CEILING	24 x 24	[600 x 600]	10 x 10	[250 x 250]	18	NONE	WHITE	-----
RG-3	PERFORATED	375	[180]	600	[280]	0.126	32.000	TEE GRID CEILING	24 x 24	[600 x 600]	12 x 12	[300 x 300]	20	NONE	WHITE	-----
EG-1	PERFORATED	50	[24]	100	[47]	0.056	14.000	TEE GRID CEILING	24 x 24	[600 x 600]	6 x 6	[150 x 150]	15	NONE	WHITE	-----
EG-2	PERFORATED	100	[47]	210	[99]	0.088	22.000	TEE GRID CEILING	24 x 24	[600 x 600]	8 x 8	[200 x 200]	15	NONE	WHITE	-----
EG-3	PERFORATED	210	[99]	375	[180]	0.103	26.000	TEE GRID CEILING	24 x 24	[600 x 600]	10 x 10	[250 x 250]	18	NONE	WHITE	-----
EG-4	PERFORATED	600	[99]	900	[180]	0.153	26.000	TEE GRID CEILING	24 x 24	[600 x 600]	14 x 14	[250 x 250]	25	NONE	WHITE	-----
EG-5	FIXED HORIZONTAL BLADE, RETURN GRILLE, 0 DEF, 3/4" BLD SPACE	750	[99]	1000	[180]	0.045	12.000	DUCT / WALL	19.75 x 19.75	[502 x 502]	18 x 18	[460 x 460]	25	NONE	WHITE	-----

NOTES: PROVIDE SQUARE TO ROUND ADAPTER AS NEEDED.

BID DOCUMENTS	04/06/2012
Revisions:	Date

CONSULTANTS:

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11-005

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MEP PROJECT NO.: U08.09.04

Drawing Title: MECHANICAL SCHEDULES

Approved: Project Director

Project Title: OSCAR G. JOHNSON VA MEDICAL CENTER EXPAND MENTAL HEALTH - 3C

Location: IRON MOUNTAIN, MICHIGAN

Date: APRIL 6, 2012 | Checked: GJ | Drawn: JRM

Project Number: 585-09-103

Building Number: No. 1

Drawing Number: M.603

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Office of Construction and Facilities Management

Department of Veterans Affairs

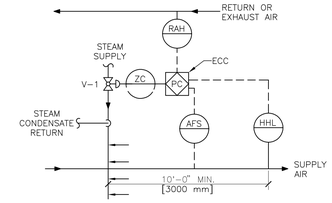
VA FORM 08-6231, OCT 1978

CONTROL SYMBOLS

T	ROOM THERMOSTAT	PSH	PRESSURE SWITCH HIGH
M	ROOM HUMIDISTAT	KR	LOCAL RECORDING TIME CLOCK (RUNTIME)
TT	TEMPERATURE TRANSMITTER	S20	INSTRUMENT OR CONTROL AIR AT 20–PISG
TT	TEMPERATURE TRANSMITTER, AVERAGING ELEMENT	EPT	ELECTRONIC TO PNEUMATIC TRANSDUCER
MT	MOISTURE (HUMIDITY) TRANSMITTER	AT CO2	CARBON DIOXIDE TRANSMITTER
PT	PRESSURE TRANSMITTER	AT CO	CARBON MONOXIDE TRANSMITTER
SPS	STATIC PRESSURE SENSOR	AT OC	OCCUPANCY SENSOR
FT	FLOW TRANSMITTER	LTCP	LOCAL TEMPERATURE CONTROL PANEL
IT	CURRENT TRANSMITTER	HVAC	HVAC CONTROL PANEL
CT	CONDUCTIVITY TRANSMITTER	ASD	ADJUSTABLE SPEED DRIVE
SD	SMOKE DETECTOR	ECC	INTEGRATE CONTROL POINT ON REMOTE GRAPHICS WORKSTATION AT ENERGY CONTROL CENTER
M	ELECTRIC OPERATED CONTROL DAMPER/OR VALVE	TC	TEMPERATURE CONTROLLER. SEE SEQUENCE OF OPERATION
dPT	DIFFERENTIAL PRESSURE TRANSMITTER	PC	PRESSURE CONTROLLER. SEE SEQUENCE OF OPERATION
HS	HAND SWITCH (HAND–OFF–AUTO SWITCH)	SC	SPEED CONTROLLER. SEE SEQUENCE OF OPERATION
KC	TIME CLOCK CONTROLLING EQUIPMENT ON A SCHEDULE	FC	FLOW CONTROLLER. SEE SEQUENCE OF OPERATION
ZC	VALVE OR DAMPER POSITION CONTROLLER		MOTOR STARTER
KR	LOCAL RECORDING TIME CLOCK (RUNTIME)	FS	FLOW SWITCH
TSL	TEMPERATURE SWITCH, LOW (FREEZESTAT)		TEMPERATURE SENSING ELEMENT FOR TRANSMITTING TEMPERATURE TO EMCS (PROVIDE 12 INCHES [200mm] MINIMUM LENGTH IN DUCT WHEN SPACE PERMITS.)
LC	LEVEL CONTROLLER	A	SENSOR WITH AVERAGING ELEMENT TO TRANSMIT TEMPERATURE TO EMCS
LT	LEVEL TRANSMITTER		
M	CONTROL AIR MAIN		
EP	ELECTRO–PNEUMATIC (EP) SWITCH		

CONTROLS GENERAL NOTES

1. CONTRACTOR SHALL SUPPLY ALL MATERIALS AND DEVICES TO MAINTAIN AND MONITOR NEGATIVE PRESSURE IN ALL CONSTRUCTION ZONES AND SHALL WORK WITHIN INTERIM LIFE SAFETY MEASURES (ILSM) PROVIDED BY THE OWNER.



STEAM HUMIDIFIER
RETURN (OR EXHAUST) AIR HUMIDITY SHALL BE MONITORED. ON A CALL FOR HUMIDIFICATION, HUMIDIFIER VALVE V–1 SHALL MODULATE TO MAINTAIN THE RETURN (OR EXHAUST) AIR HUMIDITY SET POINT TO 20% (ADJUSTABLE). THE HIGH LIMIT HUMIDITY SENSOR, LOCATED IN THE SUPPLY AIR DUCT 10 FEET AWAY FROM THE HUMIDIFIER, SHALL DISABLE THE HUMIDIFIER AND GIVE AN ALARM SIGNAL TO THE ECC IF THE SUPPLY AIR HUMIDITY EXCEEDS 90% RH (ADJUSTABLE). THE AIRFLOW SWITCH SHALL PROVE AIRFLOW BEFORE HUMIDITY CONTROLS ARE ACTIVATED.

1 STEAM HUMIDIFIER CONTROLS

NTS

SYSTEM: STEAM HUMIDIFIER

SYSTEM COMPONENT:	POINT ID	ABBREVIATION	POINT LEGEND	SYSTEM OUTPUTS: BINARY	SYSTEM OUTPUTS: ANALOG	SYSTEM INPUTS: BINARY	SYSTEM INPUTS: ANALOG	SYSTEM SOFTWARE/CONTROL: ALARM PROCESSING	SYSTEM SOFTWARE/CONTROL: APPLICATION/FUNCTION	REMARKS
HUMIDITY HIGH LIMIT	BI–1	HHL				●		●●●	●	
RETURN AIR HUMIDITY	AI–1	RAH					●	●●●		
STEAM CONTROL VALVE	AO–1	V–1		●						
STEAM ON/OFF VALVE	AO–2	V–2		●						
AIR FLOW SWITCH	BI–2	AFS				●				

STEAM HUMIDIFIER
ALL SECONDARY HUMIDIFICATION ROOM CONTROL POINTS TO BE CONNECTED TO THE EXISTING BUILDING AUTOMATION SYSTEM (BAS).

2 POINTS LIST FOR STEAM HUMIDIFIER

NTS

JOB: 585–09–103
BUILDING: VA IRON MOUNTAIN, MI
PAGE:

SYSTEM: 3RD FLOOR DENTAL & MENTAL AREAS ROOM AIR BALANCE MONITORING DENTAL & MENTAL AREAS

SYSTEM COMPONENT:	POINT ID	ABBREVIATION	POINT LEGEND	SYSTEM OUTPUTS: BINARY	SYSTEM OUTPUTS: ANALOG	SYSTEM INPUTS: BINARY	SYSTEM INPUTS: ANALOG	SYSTEM SOFTWARE/CONTROL: ALARM PROCESSING	SYSTEM SOFTWARE/CONTROL: APPLICATION/FUNCTION	REMARKS
ROOM SUPPLY AIRFLOW (CFM)	AI–1	SAF				●		●●	●	1–11
ROOM RETURN AIRFLOW (CFM)	AI–2	RAF				●		●●	●	1–11
ROOM EXHAUST AIRFLOW (CFM)	AI–3	EAF				●		●●	●	1–11
ROOM DIFFERENTIAL AIRFLOW (%)		RDA					●	●●	●	1–11
CONSTRUCTION AREA PRESSURE	AI–4	PS				●		●●	●	12

REMARKS:

1. WAITING 3105; –15%
2. WAITING 3219; –15%
3. OPERATORY 3229 / OPERATORY 3230, SINGLE EXHAUST FOR PAIR OF OPERATORIES; +15%
4. OPERATORY 3231 / OPERATORY 3232, SINGLE EXHAUST FOR PAIR OF OPERATORIES; +15%
5. OPERATORY 3233 / OPERATORY 3234, SINGLE EXHAUST FOR PAIR OF OPERATORIES; +15%
6. LAB 3236; –15%
7. CLEAN STORAGE STERILE 3238; +15% / SOILED 3236; –30%, SINGLE EXHAUST FOR PAIR OF ROOMS
8. XRAY 3228; +15% / XRAY CONTROL 3228A; +15%, SINGLE EXHAUST FOR PAIR OF ROOMS
9. PASSAGE 3237; 0%
10. PROVIDE UNOCCUPIED AIRFLOW REDUCTION (ADJUSTABLE) IN THE FOLLOWING DENTAL SUITE SPACES WHILE MAINTAINING CONSTANT AIRFLOW PERCENT OFFSET TO CONTINUOUSLY MAINTAIN REQUIRED PRESSURE RELATIONSHIP: OPERATORIES 3229, 3230, 3231, 3232, 3233, 3234, LAB 3236, CLEAN STERILE STORAGE 3238, SOILED 3236, PASSAGE 3237.
11. OCCUPIED/UNOCCUPIED TIME FOR AIR FLOW AND TEMPERATURE TO BE PROGRAMMED THROUGH 365 DAY CALENDAR IN ECC, PROVIDE MANUAL OVERRIDE SWITCH WITH THERMOSTAT FOR EACH SPACE.
12. CONSTRUCTION ZONE EXPAND MENTAL HEALTH 3C; –0.05 IN H2O

3 POINTS LIST FOR ROOM AIR BALANCE MONITORING

BID DOCUMENTS	04/06/2012
Revisions:	Date

CONSULTANTS:

ARCHITECT/ENGINEERS:

adg
11-005

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MEP PROJECT NO.: U08.09.04

Drawing Title: TEMPERATURE CONTROL DIAGRAMS AND SEQUENCE OF OPERATION

Approved: Project Director

Project Title: OSCAR G. JOHNSON VA MEDICAL CENTER EXPAND MENTAL HEALTH - 3C

Location: IRON MOUNTAIN, MICHIGAN

Date: APRIL 6, 2012 | Checked: GJ | Drawn: JRM

Project Number: 585-09-103

Building Number: No. 1

Drawing Number: M.604

Dwg. 38 of 45

Office of Construction and Facilities Management

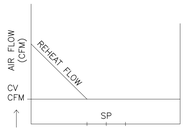
Department of Veterans Affairs

VA FORM 08–6231, OCT 1978

CV BOX CONTROL SEQUENCE

NO DEADBAND

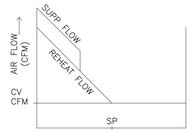
A. UPON FALL IN SPACE TEMPERATURE BELOW SET POINT VALVE V-1 WILL MODULATE TO MAINTAIN SET POINT ± .5°, THE ADJUSTABLE TOLERANCE OF ± .5° HAS BEEN SELECTED TO PREVENT VALVE HUNTING
B. THE REVERSE SHALL OCCUR ON RISE IN SPACE TEMPERATURE.



CV BOX CONTROL SEQUENCE

W/DEADBAND

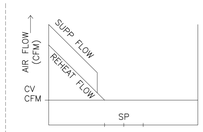
A. SET POINTS SHALL SET AS FOLLOWS: COOLING 75° F (ADJ) HEATING 70° F (ADJ) DEADBAND OF 5° F BETWEEN HEATING AND COOLING SET POINT WILL BE MAINTAINED
B. UPON FALL IN SPACE TEMPERATURE BELOW SET POINT VALVE V-1 WILL MODULATE TO MAINTAIN SET POINT ± .5°,THE ADJUSTABLE TOLERANCE OF ± .5° HAS BEEN SELECTED TO PREVENT VALVE HUNTING
C. THE REVERSE SHALL OCCUR ON RISE IN SPACE TEMPERATURE.



CV BOX CONTROL SEQUENCE

NO DEADBAND

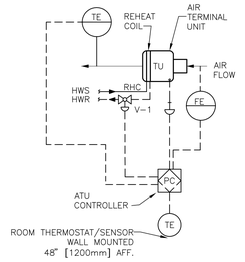
A. UPON FALL IN SPACE TEMPERATURE BELOW SET POINT VALVE V-1 WILL MODULATE TO MAINTAIN SET POINT ± .5°, THE ADJUSTABLE TOLERANCE OF ± .5° HAS BEEN SELECTED TO PREVENT VALVE HUNTING
B. VALVE V-2 SHALL BE ENABLED WHEN OUTSIDE AIR FALLS BELOW 40° F (ADJ) AND VALVE V-1 HAS BEEN MODULATED OPEN ABOVE 30% (ADJ) V-2 SHALL THEN BE MODULATED TO MAINTAIN SET POINT ± .5° F. THE ADJUSTABLE TOLERANCE OF .5° F HAS BEEN SELECTED TO PREVENT VALVE HUNTING.
C. THE REVERSE SHALL OCCUR ON RISE IN SPACE TEMPERATURE.



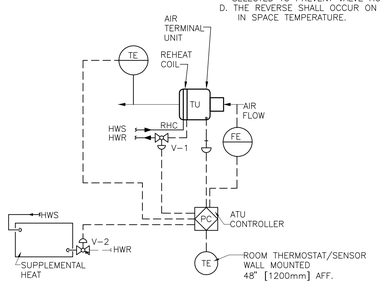
CV BOX CONTROL SEQUENCE

W/DEADBAND

A. SET POINTS SHALL SET AS FOLLOWS: COOLING 75° F (ADJ.) HEATING 70° F (ADJ) DEADBAND OF 5° F BETWEEN HEATING AND COOLING SET POINT WILL BE MAINTAINED
B. UPON FALL IN SPACE TEMPERATURE BELOW SET POINT VALVE V-1 WILL MODULATE TO MAINTAIN SET POINT ± .5°, THE ADJUSTABLE TOLERANCE OF ± .5° HAS BEEN SELECTED TO PREVENT VALVE HUNTING
C. VALVE V-2 SHALL BE ENABLED WHEN OUTSIDE AIR FALLS BELOW 40° F (ADJ) AND VALVE V-1 HAS BEEN MODULATED OPEN ABOVE 30% (ADJ) V-2 SHALL THEN BE MODULATED TO MAINTAIN SET POINT ± .5° F. THE ADJUSTABLE TOLERANCE OF ± .5° HAS BEEN SELECTED TO PREVENT VALVE HUNTING.
D. THE REVERSE SHALL OCCUR ON RISE IN SPACE TEMPERATURE.



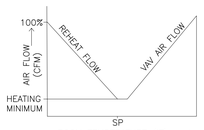
NO SUPPLEMENTAL HEATING



WITH SUPPLEMENTAL HEATING

2 CONSTANT VOLUME AIR TERMINAL UNIT CONTROL DIAGRAM

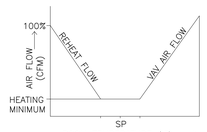
NTS



VAV BOX CONTROL SEQUENCE

NO DEADBAND

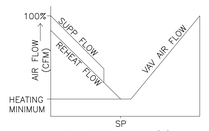
A. UPON FALL IN SPACE TEMPERATURE THE VAV DAMPER WILL MODULATE TO MINIMUM POSITION.
B. UPON FURTHER DROP IN SPACE TEMPERATURE VALVE V-1 WILL MODULATE TO MAINTAIN SET POINT ± .5° F. THE ADJUSTABLE TOLERANCE OF ± .5° F HAS BEEN SELECTED TO PREVENT VALVE HUNTING
C. THE REVERSE SHALL OCCUR ON THE RISE IN SPACE TEMPERATURE.



VAV BOX CONTROL SEQUENCE

W/DEADBAND

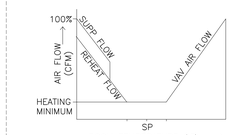
A. SET POINTS SHALL BE SET AS FOLLOWS: COOLING 75°F (ADJ.) HEATING 70°F(ADJ) DEADBAND OF 5° F BETWEEN HEATING AND COOLING SET POINTS WILL BE MAINTAINED.
B. UPON FALL IN SPACE TEMPERATURE THE VAV DAMPER WILL MODULATE TO MINIMUM POSITION.
C. UPON FURTHER DROP IN SPACE TEMPERATURE VALVE V-1 WILL MODULATE TO MAINTAIN SET POINT ± .5° F. THE ADJUSTABLE TOLERANCE OF ± .5° F HAS BEEN SELECTED TO PREVENT VALVE HUNTING
D. THE REVERSE SHALL OCCUR ON THE RISE IN SPACE TEMPERATURE.



VAV BOX CONTROL SEQUENCE

NO DEADBAND

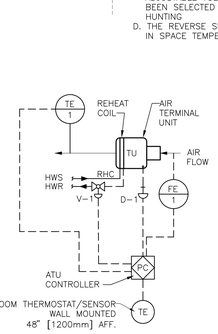
A. UPON FALL IN SPACE TEMPERATURE THE VAV DAMPER WILL MODULATE TO MINIMUM POSITION.
B. UPON FURTHER DROP IN SPACE TEMPERATURE VALVE V-1 WILL MODULATE TO MAINTAIN SET POINT ± .5° F. THE ADJUSTABLE TOLERANCE OF ± .5° F HAS BEEN SELECTED TO PREVENT VALVE HUNTING
C. VALVE V-2 SHALL BE ENABLED WHEN OUTSIDE AIR FALLS BELOW 40° F (ADJ) AND VALVE V-1 HAS BEEN MODULATED OPEN ABOVE 30% (ADJ). VALVE V-2 SHALL MAINTAIN SET POINT ± .5° F. THE ADJUSTABLE TOLERANCE OF ± .5°F HAS BEEN SELECTED TO PREVENT VALVE HUNTING. THE REVERSE SHALL OCCUR ON A RISE IN SPACE TEMPERATURE.



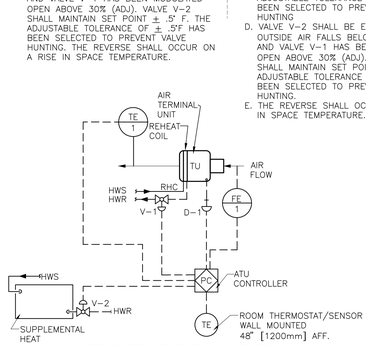
VAV BOX CONTROL SEQUENCE

W/DEADBAND

A. SET POINTS SHALL BE SET AS FOLLOWS: COOLING 75°F (ADJ.) HEATING 70°F(ADJ) DEADBAND OF 5° F BETWEEN HEATING AND COOLING SET POINTS WILL BE MAINTAINED.
B. UPON FALL IN SPACE TEMPERATURE THE VAV DAMPER WILL MODULATE TO MINIMUM POSITION.
C. UPON FURTHER DROP IN SPACE TEMPERATURE VALVE V-1 WILL MODULATE TO MAINTAIN SET POINT ± .5° F. THE ADJUSTABLE TOLERANCE OF ± .5° F HAS BEEN SELECTED TO PREVENT VALVE HUNTING
D. VALVE V-2 SHALL BE ENABLED WHEN OUTSIDE AIR FALLS BELOW 40° F (ADJ) AND VALVE V-1 HAS BEEN MODULATED OPEN ABOVE 30% (ADJ). VALVE V-2 SHALL MAINTAIN SET POINT ± .5° F. THE ADJUSTABLE TOLERANCE OF ± .5°F HAS BEEN SELECTED TO PREVENT VALVE HUNTING.
E. THE REVERSE SHALL OCCUR ON THE RISE IN SPACE TEMPERATURE.



NO SUPPLEMENTAL HEATING



WITH SUPPLEMENTAL HEATING

1 VARIABLE VOLUME AIR TERMINAL UNIT CONTROL DIAGRAM

NTS

SYSTEM: CAV TERMINAL UNITS			POINT LEGEND	SYSTEM OUTPUTS		SYSTEM INPUTS		SYSTEM SOFTWARE/CONTROL		
				BINARY	ANA-LOG	BINARY	ANALOG	ALARM PROCESSING	APPLICATION/FUNCTION	
SYSTEM COMPONENT:	POINT ID	ABBREVIATION								REMARKS
Room Temperature	AI-1	TE					●		●	
Supply Air Temperature	AI-2	TE-1					●		●	
Supply Air Flow (cfm)	AI-3	FE-1					●●		●	
VAV Damper	AO-1	D-1			●				●	
Reheat Coil Valve	AO-2	V-1			●				●	
Supplemental Heat Valve	AO-3	V-2			●				●	See Floor Plans

1. PROVIDE UNOCCUPIED SPACE TEMPERATURE SETBACK/SETUP FOR THE FOLLOWING DENTAL SUITE SPACES: OPERATORIES 3229, 3230, 3231, 3232, 3233, 3234, LAB 3236, CLEAN STERILE STORAGE 3238, SOILED 3236, PASSAGE 3237.
2. OCCUPIED / UNOCCUPIED TIME FOR AIR FLOW AND TEMPERATURE TO BE PROGRAMMED THRU 365 DAY CALENDER IN ECC, PROVIDE MANUAL OVERRIDE SWITCH WITH THERMOSTAT FOR EACH SPACE.

4 POINTS LIST FOR CAV AIR TERMINAL UNITS AND SUPPLEMENTAL HEAT

NTS

SYSTEM: VAV TERMINAL UNITS			POINT LEGEND	SYSTEM OUTPUTS		SYSTEM INPUTS		SYSTEM SOFTWARE/CONTROL		
				BINARY	ANA-LOG	BINARY	ANALOG	ALARM PROCESSING	APPLICATION/FUNCTION	
SYSTEM COMPONENT:	POINT ID	ABBREVIATION								REMARKS
Room Temperature	AI-1	TE					●		●	
Supply Air Temperature	AI-2	TE-1					●		●	
Supply Air Flow (cfm)	AI-3	FE-1					●●		●	
VAV Damper	AO-1	D-1			●				●	
Reheat Coil Valve	AO-2	V-1			●				●	
Supplemental Heat Valve	AO-3	V-2			●				●	See Floor Plans

3 POINTS LIST FOR VAV AIR TERMINAL UNITS AND SUPPLEMENTAL HEAT

NTS

CONTROL SYMBOLS

T	ROOM THERMOSTAT
M	ROOM HUMIDISTAT
TT	TEMPERATURE TRANSMITTER
TT	TEMPERATURE TRANSMITTER, AVERAGING ELEMENT
MT	MOISTURE (HUMIDITY) TRANSMITTER
PT	PRESSURE TRANSMITTER
SPS	STATIC PRESSURE SENSOR
FT	FLOW TRANSMITTER
IT	CURRENT TRANSMITTER
CT	CONDUCTIVITY TRANSMITTER
SD	SMOKE DETECTOR
M	ELECTRIC OPERATED CONTROL DAMPER/OR VALVE
dPT	DIFFERENTIAL PRESSURE TRANSMITTER
HS	HAND SWITCH (HAND-OFF-AUTO SWITCH)
KC	TIME CLOCK CONTROLLING EQUIPMENT ON A SCHEDULE
ZC	VALVE OR DAMPER POSITION CONTROLLER
KR	LOCAL RECORDING TIME CLOCK (RUNTIME)
TSL	TEMPERATURE SWITCH, LOW (FREEZESTAT)
LC	LEVEL CONTROLLER
LT	LEVEL TRANSMITTER
M	CONTROL AIR MAIN
EP	ELECTRO-PNEUMATIC (EP) SWITCH
PSH	PRESSURE SWITCH HIGH
KR	LOCAL RECORDING TIME CLOCK (RUNTIME)
S2O	INSTRUMENT OR CONTROL AIR AT 20-PISG
EPT	ELECTRONIC TO PNEUMATIC TRANSDUCER
AT CO2	CARBON DIOXIDE TRANSMITTER
AT CO	CARBON MONOXIDE TRANSMITTER
AT OC	OCCUPANCY SENSOR
LTCP	LOCAL TEMPERATURE CONTROL PANEL
HVAC	HVAC CONTROL PANEL
ASD	ADJUSTABLE SPEED DRIVE
ECC	INTEGRATE CONTROL POINT ON REMOTE GRAPHICS WORKSTATION AT ENERGY CONTROL CENTER
TC	TEMPERATURE CONTROLLER. SEE SEQUENCE OF OPERATION
PC	PRESSURE CONTROLLER. SEE SEQUENCE OF OPERATION
SC	SPEED CONTROLLER. SEE SEQUENCE OF OPERATION
FC	FLOW CONTROLLER. SEE SEQUENCE OF OPERATION
	MOTOR STARTER
FS	FLOW SWITCH
	TEMPERATURE SENSING ELEMENT FOR TRANSMITTING TEMPERATURE TO EMCS (PROVIDE 12 INCHES [200mm] MINIMUM LENGTH IN DUCT WHEN SPACE PERMITS.)
A	SENSOR WITH AVERAGING ELEMENT TO TRANSMIT TEMPERATURE TO EMCS

CONTROLS GENERAL NOTES

1. CONTRACTOR SHALL SUPPLY ALL MATERIALS AND DEVICES TO MAINTAIN AND MONITOR NEGATIVE PRESSURE IN ALL CONSTRUCTION ZONES AND SHALL WORK WITHIN INTERIM LIFE SAFETY MEASURES (ILSM) PROVIDED BY THE OWNER.

BID DOCUMENTS	04/06/2012
Revisions:	Date

CONSULTANTS:

ARCHITECT/ENGINEERS:

adg 11-005

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Phone: 715.832.5680 | Fax: 715.832.5668 | www.mepassociates.com
MEP PROJECT NO.: U08.09.04

Drawing Title: TERMINAL UNIT CONTROLS DIAGRAM AND SEQUENCE OF OPERATION

Approved: Project Director

Project Title: OSCAR G. JOHNSON VA MEDICAL CENTER EXPAND MENTAL HEALTH - 3C

Location: IRON MOUNTAIN, MICHIGAN

Date: APRIL 6, 2012 | Checked: GJ | Drawn: JRM

Project Number: 585-09-103

Building Number: No. 1

Drawing Number: M.605

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Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231, OCT 1978